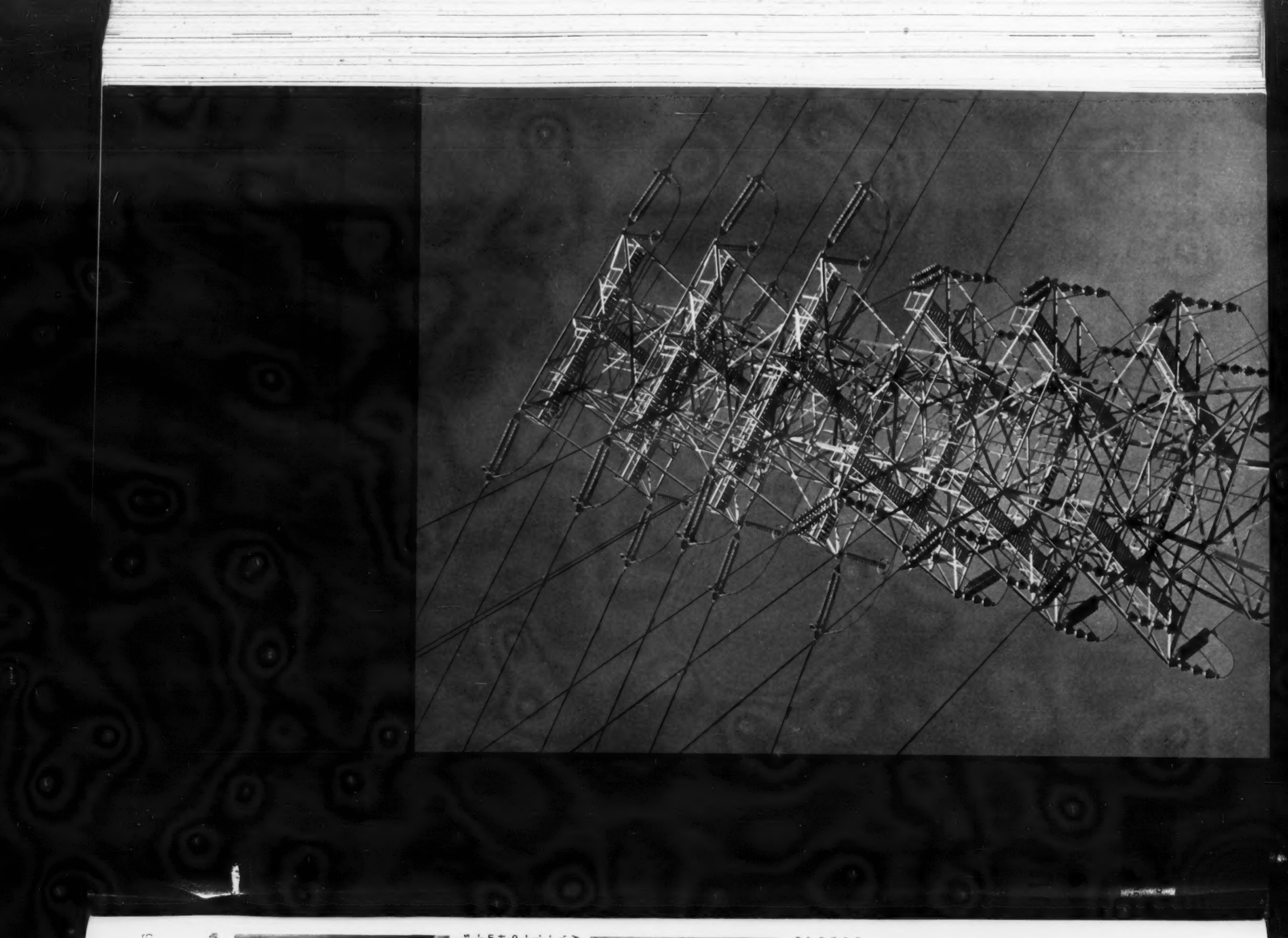

DINNER? IT'S COOKING NOW ON MY ELECTRIC RANGE
Electric cooking needs no watching...
REMOTE CONTROL
WE'RE GOING NOW TO BUY A NEW ELECTRIC RANGE
An electric range is easy to own...
SOLD ON EASY TERMS . . . . SEE YOUR ELECTRICAL DEALER TODAY
OF COURSE I'LL BE COOKING ON AN ELECTRIC RANGE
Electric cooking is modern...
MY ELECTRIC RANGE CERTAINLY KEEPS THE KITCHEN COOL
The electric range is insulated...
GET YOURS NOW...SEE YOUR ELECTRICAL DEALER TODAY

SOUTHERN CALIFORNIA EDISON COMPANY LTD.

7-39

ELECTRICAL WEST (with which is consolidated The Journal of Electricity), July, 1939, Vol. 83, No. 1. Published Monthly by the McGraw-Hill Company of California, 883 Mission St., San Francisco, Calif. Entered as second class matter at the post office at San Francisco under the Act of March 3, 1879. Additional entry as second class matter at the post office at Los Angeles. Printed in U. S. A. Subscription rate in U. S. and U. S. possessions, and Canada, $2 per year; all other countries $3 gold (thirteen shillings). Single copy 25c.
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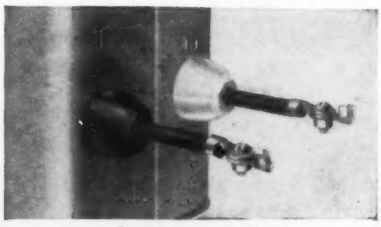
Now Same Size–Same Price

But

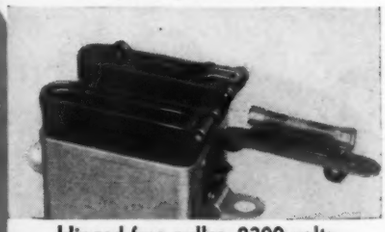
Better Accuracy * Higher Insulation

with these **NEW G-E Indoor Potential Transformers**

Types JE-1 and JE-2
Superseding Types JE-31 and JE-32
2300 VOLTS AND BELOW
60 Cycles



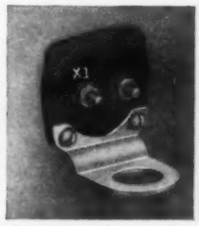
Primary terminals



Hinged fuse puller, 2300 volts

Mounting supports

Hinged fuse puller, 230 to 575 volts



Secondary terminals Cover and sealing bar

ACCURACY: These new Types JE-1 and JE-2 transformers maintain accuracy well within the highest NEMA classifications—½W, ½X, and ½Y. Furthermore, their characteristics have been so improved that from no load to full load the ratio curve has a slope of less than one per cent—the phase-angle curve, a slope of only 32 minutes!

INSULATION: You get a 2300-volt transformer that meets the 1.6-inch impulse test-gap requirements of the A.S.A. This results from better insulation than that of superseded types—provided without any increase in the size of the transformer. Lower voltage ratings meet the 0.8-inch impulse test-gap requirements.

NO INCREASE IN PRICE: You get all the advantages of the new Types JE-1 and JE-2 at no extra cost. Call the nearest G-E office for further information, or write General Electric, Schenectady, N. Y., for Publication GEA-3184.

HEADQUARTERS FOR ELECTRICAL MEASUREMENT

GENERAL ELECTRIC

420-53

BETWEEN THIS MONTH'S COVERS

Industrial Electrification

MORE GOODS (p. 17): Remote indeed is that phase of American industry which has not benefited from electrification. Few people—even in the electrical business—appreciate how much industrial electrification has meant to economic and social progress in America. In telling this story E. O. "Bill" Shreve, G-E vice-president in charge of sales, can speak with authority. He is a Westerner by adoption. He came to the San Francisco G-E office just a few days after the 1906 "fire." In the intervening 20 years he obtained that diversified industrial sales experience which is characteristic of the West. He had been San Francisco district manager of G-E eight years when he was called to Schenectady in 1926 to become manager of the company's industrial department. He has been vice-president in charge of sales since 1934.

Collegiate Salesmen

APPLIANCE SELLING—COLLEGE TAUGHT (p. 20): Where to get high-calibre sales recruits has troubled many in the electrical field. In Los Angeles something has been done about it. A group of electrical men and educators have cooperatively worked out a curriculum being used at Los Angeles City College. Results to date are excellent according to the author, who is Chester O. Broders, teacher-coordinator of distributive education for the L. A. schools.

Matchless Home

SOUTHERN CALIFORNIA HOME SHOW (p. 29): To steal a show the performer must have something. Because the Matchless Electric Home had more novel electrical ideas in it than even the electrical industry knew, it was the main attraction at the Southern California Home Show. The Sales Guide in this issue, (p .25) on the selling of Electric Kitchens, illustrates some of this Matchless Home's kitchen ideas.

Fault Clearing

RECLOSING OCB's VS. REPEATING FUSES (p. 32): Reclosing oil circuit breakers worked so well in substations that repeating fuses were introduced several years ago for use on distribution lines. More recently, at least two manufacturers have introduced small, reclosing oil breakers for the same purpose. Breakers cost more, but can be reset remotely. Several Northwest companies report in detail how these two types of equipment have performed. Some of the available equipment is illustrated and tables show the range of prices for fuses and breakers in various ratings and the operating records of 63 installations. Author of this Northwest Assn. report is R. S. Daniels, California Oregon Power Co.

Relays Help Radio

TWO-SOURCE SERVICE FOR KNX (p. 35): When Columbia built its new transmitter near Redondo in southern California, Edison was called upon to furnish service. This was done by supplying the station from two sources, through a consumer-type substation. To allow the radio engineers to operate on either line at will, or on loop, and at the same time provide automatic transfer and keep the controls extremely simple are the results of an ingenious relay scheme. The authors: J. H. Vivian, superintendent of relays, L. F. Hunt, protection engineer, both of Southern Cal. Edison.

Adequate Wiring

NATIONAL HOUSING EXPOSITION (p. 38): Seattle people were told the need for adequate home wiring by two exhibits at a recent housing show there. A model home, adequately wired, was erected through the fine cooperative effort of union electricians, contractors, wiring materials manufacturers and utilities sponsored by the Electric Club of Washington. A display booth, brilliantly lighted, attracted home-showgoers to explanations of wiring materials, fixtures, and lighting equipment.

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Cover: A crossover tower in the Compton district in southern California, photographed by Jesse Owen Smith, an expert in industrial and marine photography

Microbe Extinction

STERILIZING BY ULTRAVIOLET (p. 41): Modern men of science have constantly been following in the footsteps of the fathers of sterilization, Pasteur and Lister and others. Today two men at the Westinghouse Lamp Division laboratories can proudly offer to the world —sterilization by ultraviolet, effecting the extinction of microbes in the air with deadly ultraviolet wave bands generated in sterilamps. W. C. McHenry, author of this article, is director of Sterilamp sales on the West Coast for the Westinghouse Lamp Co.

IAEI Program

INSPECTORS' MEETING (p. 42): When the two Far Western associations of electrical inspectors meet for the second time jointly in San Francisco, Aug. 14-17, the proposals for radical code changes made by the Edison Electric Institute will be discussed, but only in their due course as they emerge as suggested modifications of particular article committees. The program is set up to provide maximum time for code discussion, and afternoons off for visits to the Exposition.

Along the Front Line

NEWS OF THE INDUSTRY (p. 48): Frank Banks, Bonneville, explains his stand on public utility district formation. . . . Washington Counties keep Supreme Court humming with activity. . . . Hood River County votes against formation of public utility district. . . . Portland G-E celebrates 50th year anniversary.

Coming in August

NEXT MONTH: Appropriate to the two conventions—the 33rd annual convention of the Illuminating Engineering Society, (the first in the far West), and the second joint annual meeting of the Northwestern and Southwestern Sections, International Association of Electrical Inspectors—emphasis will be placed on late and particularly interesting lighting and wiring installations of the West. A review of the Edison Electric Institute's case for code changes, and late developments in fluorescent lighting technique will be found too.

HOT MONEY

YESTERDAY *one thief* stole more dollars from American Industry than *all* the "stick-up" men took from the public.

This industrial thief is FRICTION. His "hot money" is *your* money—represented in wasted power, rapid wear, costly delays and repairs.

To catch money-stealing Friction red-handed is the job of a group of scientists, engineers and technicians as skilled in their own art as are the "G-Men."

And these "friction-catchers" are at your service instantly, anywhere in America.

Shell keeps a force of them always ready. They are armed with friction-killing lubricants of numerous types and grades. And these Shell specialists have an enviable record for their *arrests* of friction. Thousands of big and little cases on big and little machines crowd their case-history files.

Call in the Shell lubrication man today. There is no charge for his help and no obligation to you.

SHELL

SHELL INDUSTRIAL LUBRICANTS

NEW PRODUCTS

Lineman's Belt (701)

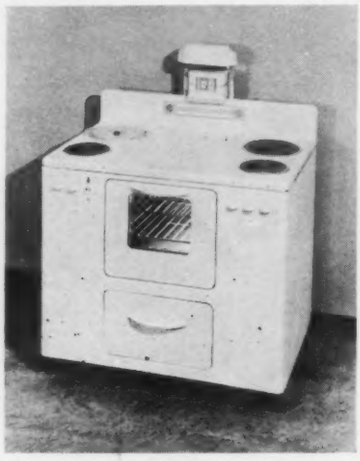
New lineman's body belt presented by Davis Emergency Equipment Co. consists of a wide leather pad, which carries the D rings to which the safety strap is attached, and the belt proper. Unusual strength and durability are claimed for the belt.

Lamp Pull-Arm (702)

The Switchmatic is a new kind of extension pull arm for both canopy switches and holder receptacles offered by Eagle Electric Mfg. Co. It is said to simplify the operation and insure longer life to the entire lighting unit. It is easily attached.

"Look-In" Oven Door (703)

The oven door on the kitchen stove is now a show window. Through the "Look-in" door of the new Victor range introduced by the Merchandising Division of the Westinghouse Electric & Mfg. Co., one may see foods being cooked. A small switch turns on a brilliant light in the oven. Heavy heat-resisting glass comprises the window, and it is able to withstand temperatures higher than normal cooking temperatures. No heat is uselessly wasted by opening oven doors.



Flush Tumbler Switch (704)

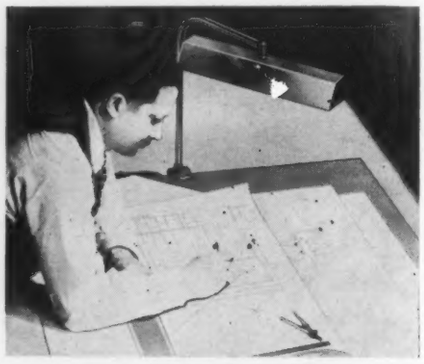
A new flush tumbler switch, incorporating a double pole, double throw tumbler switch mechanism with three distinct lever positions, is presented by the Arrow-Hart & Hegeman Electric Co. This switch fits a standard deep wall case and is rated 20 amp., 125 volts; 10 amp., 250 volts.

Climator (705)

In presenting a complete new line of ranges, the Thermador Electric Mfg. Co. introduces the Climator, an electric heater and air fan that warms or cools the kitchen, according to the weather. This added built-in feature in range design is particularly welcome in western and southern homes.

Fluorescent Clamp-on Lamp (706)

The new fluorescent Clamp-On Lamp of the Mitchell Mfg. Co., uses the new T-8, 15 watt fluorescent daylight bulb. Bronze plated, with both arm and shade adjustable, this convenient lamp may be used on 110-120 volt, 60 cycle, a.c. current, unless d.c. current is specified.



Clear Baking Varnish (707)

A radically new type of insulating varnish for use on electrical windings has been announced by the John C. Dolph Co. This new grade, known as Synthite, PG-1, Clear Baking Varnish, possesses the ability to dry throughout even the very deepest windings. It has a high dielectric value, tests finding it to be in excess of 1,800 volts per mil.

ANNOUNCING *the reappointment of*

ALLIED INDUSTRIES, INC.

as Pacific Coast Representatives of

OK BRAND

FRICTION TAPE

and Splicing Compounds

■ To better distribute the superior OK Friction Tape and Splicing Compound lines to the Coast Trade, we have appointed Allied Industries, Inc., our Pacific Coast representatives.

Popular for more than 20 years, these easy-to-say, easy-to-use lines now will be stocked at four convenient Pacific Coast points. Send for your FREE OK Samples N O W !

APPLETON RUBBER COMPANY, INC. . . . . . **FRANKLIN, MASS.**

ALLIED INDUSTRIES, INC. SAN FRANCISCO 1135 HARRISON ST. · SEATTLE 532 1ST AVENUE · PORTLAND 535 N.W. 11TH AVE. · LOS ANGELES 459-59 S. HEWITT ST.

GOOD INSULATORS

KNOW THEM BY V THIS SIGN

VICTOR INSULATORS, INC.

VICTOR, N.Y., U.S.A.

---are pleased to announce the appointment of Maydwell & Hartzell, Inc., exclusive sales representatives for the Pacific Coast area

The combination of Victor Insulators, Inc.,—operating the first and original high voltage porcelain plant and whose engineering and factory personnel include a number of the first men in this field, representing collectively more than 1000 years in the design and manufacture of wet process porcelain insulators;—and Maydwell & Hartzell, Inc.—the longest established organization on the Pacific Coast devoting its activities exclusively to the sale of transmission and distribution equipment, and whose personnel collectively represents more than 200 years in this specialized field—will prove beneficial to the Electrical industry in the West.

V

THE MARK OF GOOD INSULATORS

Produced by craftsmen with a lifetime of experience under careful and scientific supervision by a plant equipped with all modern and necessary facilities for exact control of ceramic, mechanical and electrical characteristics of each item, thereby assuring you of Safe Performance.

Every piece of Victor porcelain is subjected to the closest inspection and most severe testing before it is shipped.

Internationally known and used throughout the electrical industry, Victor Insulators give Long Life—Low Maintenance Cost—Safe Lasting Performance.

OUR NAME MAYDWELL SPELLS QUALITY

A REPUTATION FOR QUALITY and SERVICE

Utilities on the Pacific Coast recognize this trademark as the sign of a responsible distributor.

Maydwell & Hartzell, Inc., have specialized in the sale of complete transmission and distribution equipment since 1923, with a policy of handling only products of proven quality by known reliable manufacturers.

Through personnel well trained in this particular field and with warehouses located at strategic points on the Pacific Coast, Maydwell & Hartzell, Inc., has built up an enviable reputation for unexcelled quality and superior service.

OUR NAME MAYDWELL SPELLS QUALITY

MAYDWELL & HARTZELL

INCORPORATED

ENGINEERS & MANUFACTURERS REPRESENTATIVES

LOS ANGELES SAN FRANCISCO PORTLAND

Ideal Banking Service FOR **SALESMEN**

Traveling men, salesmen — men and women whose jobs prevent their calling at the bank in person, find our BANK-BY-MAIL Service ideal. They do their banking when most convenient, night or day and wherever there is mail service. Prompt. Reliable. Overnight to most points in California.

Write today...

for free Bank-by-Mail kit containing all necessary forms, return envelope and simple instructions.

CROCKER FIRST NATIONAL BANK
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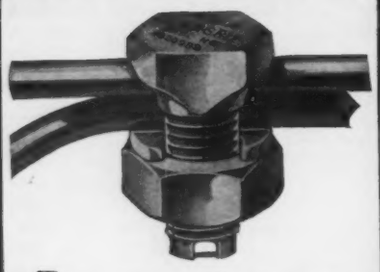


BLACKBURN Connectors are made completely of high-strength Duronze. Duronze, a silicon bronze actually stronger than steel, is more non-corrosive than pure copper or commercial bronze, commonly used in connectors. It contains no zinc and will not season-crack under the most severe weathering conditions.

for DURABILITY *Specify*
BLACKBURN CONNECTORS

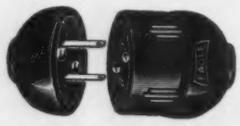
JASPER BLACKBURN PRODUCTS CORP.
Main and Clinton Sts. St. Louis, Mo.

Stud Mole (708)

The Burndy Stud Mole, type ZMLD, a combined insulated multiple terminal and bushing, replacing porcelain bushings and gaskets on network protectors used in underground distribution, has been announced by the Burndy Engineering Co. It can be used with all types of cables, leaded or non-leaded; also for making multiple terminal connections on distribution transformers.

Rubber Cord Connector (709)

A new Jumbo rubber cord connector, suitable for portable lights, saws, floor scrapers, pumps, and any portable motor driven machine, has been added to the numerous electrical specialties manufactured by the Eagle



Electric Mfg. Co. There is a fibre disc with ample clearance to facilitate easy wiring, and a two-screw fastening for rigid and permanent assembly.

Hotpoint Washer (710)

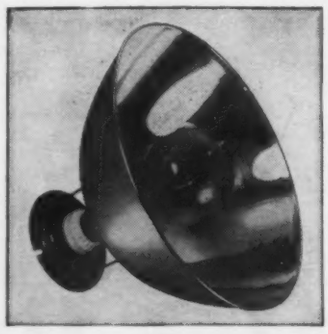
Leading the new 1939 Hotpoint wringer model washers is the cabinet-type Puritan with a capacity of 9 lb. of dry clothes. A round steel skirt extends from the bottom of the bullet-shaped tub to within 3 in. of the floor, concealing the pump. Three-zone washing action is available as a result of the Thriftivator agitator, consisting of three vanes beginning above the water line and extending to the bottom on a gradually accelerated radius. The ¼-hp. motor runs in a live rubber mounting and is equipped with end-play silencers.

Electric Automatic Control (711)

The new Sterling 3 h.p. Speed-Trol makes available for the first time an inexpensive, completely automatic variable speed system. Arranged with electric automatic control, this equipment has 4:1 infinite speed variation, with 30:1 type "B" Slo-speed gear reduction, giving output shaft speeds of 60 to 15 rpm.

Aluminum Reflectors (712)

The application of the incandescent lamp for radiant energy drying is of interest where drying, baking and heating operations take place. Alzak aluminum reflectors for applica-



tion with the new G. E. 250-watt CX drying bulbs have been developed by the Edwin F. Guth Co. These reflectors are of concentrating and spread-beam types.

Projector Spot Lamp (713)

A new 150-watt Mazda projector spot lamp has been presented by the Westinghouse Lamp Division of the Westinghouse Electric & Mfg. Co. This lamp produces 10,500 candlepower in the center of a beam about 20 degrees wide. The over-all length is 5 5/16 in. It has a rated life of 1,000 hrs. The medium screw base fits an ordinary light socket.

ELECTRICAL TESTING LABORATORIES

Electrical Photometrical, Chemical and Mechanical Tests. Inspection of Materials and Apparatus at Manufactory.

2 East End Ave. New York

G.C.A.
Lamp Replacers
Lamp Base Removers
Cartridge Fuse Tongs
Switch Hooks

Send for Catalogue
We have been making safety tools for 24 years

THE G. C. A. Manufacturing Co.
Pittsfield, Mass.

TORK CLOCKS

NEW ELECTRICALLY DRIVEN 1939 MODELS NOW AVAILABLE

WITH PLAIN OR ASTRONOMIC DIALS

Whenever it is desired to turn Current on and off Regularly there is a new model Tork Clock that can do it.

THE TORK CLOCK CO., Inc.
MOUNT VERNON, N. Y.

Representatives:
A. R. Slimmon, 445 E. 3d St., Los Angeles
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H. M. Sayers, 1019 Eastlake Ave., Seattle
Stevens Sales Co., 41 P. O. Place, Salt Lake City

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● COST of undisplayed classified ads is 5 cents a word, minimum $1.00 insertion. Box numbers in care of our San Francisco office count as 10 words additional in undisplayed ads. ● RATES per column inch of displayed ads is $3.75. ● All classified ads are payable in advance.

POSITION WANTED

ELECTRICAL ENGINEER, 26, American, Graduated March 1939 University of Vienna, Austria. Experienced. Unusual wide scope of training. Prepared to deal independently with any problem in designing or in power distribution and utilization. Eager to prove his abilities. Box 10, ELECTRICAL WEST, 833 Mission St., San Francisco, Calif.

HOW TO PUT THE STORY OF ADEQUATE WIRING INTO *Action?* .. HERE'S ONE WAY IT'S BEING DONE ..

1 An attractive LIFE house was built in La Grange Park, Illinois, distinctive Chicago suburb. The house was opened for public inspection by Wm. Joern & Sons, the builders.

2 The office of the local Power Company, having assisted Wm. Joern & Sons in planning a modern wiring installation, through its architects' and builders' service department, saw an opportunity to emphasize adequate wiring to the 25,000 people who inspected the house.

3 They designed demonstration panels showing how the house was wired . . . what equipment was used and why. Above, Mr. Charles Joern is showing how the Square D Multi-breakeR was installed — explaining its advantages over fusible equipment.

4 The house inspection ended, the demonstration panel is now shown in various offices, to those who come to pay bills or exchange bulbs. Those who evince interest are told about Square D Multi-breakeRs and adequate wiring.

5 And on visits to architects and contractors, the panel goes along, to be shown and talked about. Experience has shown that it gets a lot more attention than a wiring diagram and gets the story across in a hurry.

★ ★ ★

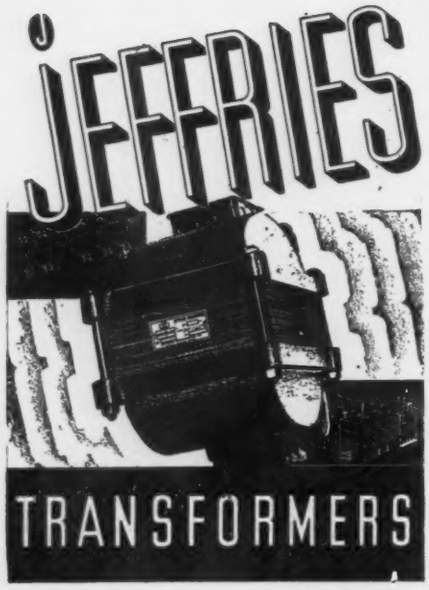
● The Square D Multi-breakeR is an important factor in adequate wiring. It offers the customer protection and convenience. To Power Companies it means customer good will, less service expense and more load on the "pay side of the meter."

CALL IN A SQUARE D MAN

SQUARE D COMPANY

LOS ANGELES - MILWAUKEE - DETROIT

IN CANADA: SQUARE D COMPANY CANADA LIMITED, TORONTO, ONTARIO



Save Their Cost and Pay Dividends by—

1. Elimination of duplicate conduit runs.
2. Saving in power rate.

(Put all of your 110-volt equipment on a 220-volt or 440-volt power circuit, it is economical.)

JEFFRIES TRANSFORMER COMPANY
5706 Long Beach Ave. Los Angeles

Crapo GALVANIZED PRODUCTS

Where strains and stresses are heaviest, where corrosion takes its greatest toll, *Crapo* Galvanized Steel Strand and Telephone Wire constantly are proving their outstanding superiority. The heavy, tenaciously bonded zinc coating, maximum tensile strength and correct ductility insure longer life and lower maintenance cost. Insist upon *Crapo* Galvanized Products for better performance under all conditions! Ask your Jobber or write direct!

INDIANA STEEL & WIRE CO.
MUNCIE, • INDIANA

Crapo Galvanized Strand and Telephone Wire can be obtained readily in all standard grades and sizes.

Food Warmer (714)

A new electric Food Warmer has been announced by the Utility Electric Co. Called the "Toastswell," this polished aluminum

warmer has a bakelite trim, and voltage 110-120 for a.c. or d.c. current.

Fish Tape Reel (715)

A handy size Fish Tape Reel and Puller, designed to fit into any electrician's tool kit, has been introduced by the Ideal Commutator Dresser Co. This fish tape reel makes it possible to pull wire through conduit in one easy operation. Known as the "Junior No. 0," it eliminates breakage, combining three tools in one.

Home Cooler Fans (716)

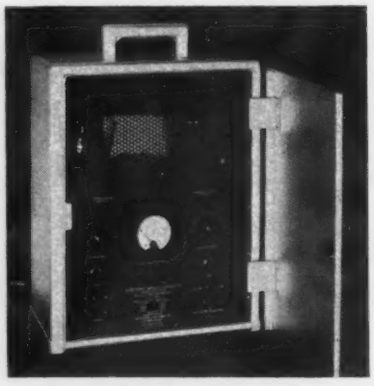
A complete new line of single-speed Home Cooler Fans for attic installation and one for window installation have been announced by the Emerson Electric Co. The attic fans are in three sizes, 36″, 42″ and 48″. Belt-driven, they exhaust from 9,000 to 16,800 cu. ft. of stagnant air per min. The window fan is for small homes, apartments, stores and offices. Streamlined and ornamental, this new unit has an 18″ fan, and has patented overlapping, aluminum blades. The motor is rubber-mounted.

Two-Gallon Water Heater (717)

"The Rocket," a new automatic electric water heater with a two-gallon capacity, has been introduced by the General Electric Co. Built for low-cost water heating by electricity in cottages, filling stations, drug stores and similar locations, this new appliance is a non-pressure, "push through" type of heater with many of the features of large G.E. automatic water heaters including the Calrod thrift-heating unit. There is a minimum of heat loss in piping, and the capacity prevents excessive current consumption. It weighs 24 pounds empty, and 40 lbs. when filled.

Electric Fish Screen (718)

Of special interest to hydro-electric engineers and conservationists is the modern Electric Fish Screen, which keeps fish away from



power flumes and condensing water intakes. This new type of screen involves the use of a vacuum tube current controlling unit as shown. Manufactured by the Electric Fish Screen Co., this equipment generates a harmless but effective current which stops all sizes and species of fish without stunning or killing them.

Delay-O-Lite (719)

The Delay-O-Lite is a unique safety device, which is an adjustable toggle switch permitting a light to stay on from 20 to 60 seconds after the switch is snapped off. Developed by the S. & W. Mfg. Co., this switch will fit standard switch boxes. It has been approved by the Underwriters Laboratories, Inc.

Diffused Light (720)

For store owners who wish to increase illumination levels, the Catchon Commodore has been designed by the F. W. Wakefield Brass Co. By removing the glassware in

existing hangers, and screwing in the Catchon Commodore, excessive surface brightness may be prevented and soft diffused light obtained.

Remote Speed Indicator

A new electric remote speed indicator for the U. S. Varidrive Motor has been developed by U. S. Electrical Motors, Inc. This device consists of a simply constructed meter as an indicator, mounted in a compact box with a push button for controlling the electric pilot motor that changes the speed. The indicator is neatly calibrated in divisions of 1 to 10; however, scales calibrated to suit other requirements are obtainable.

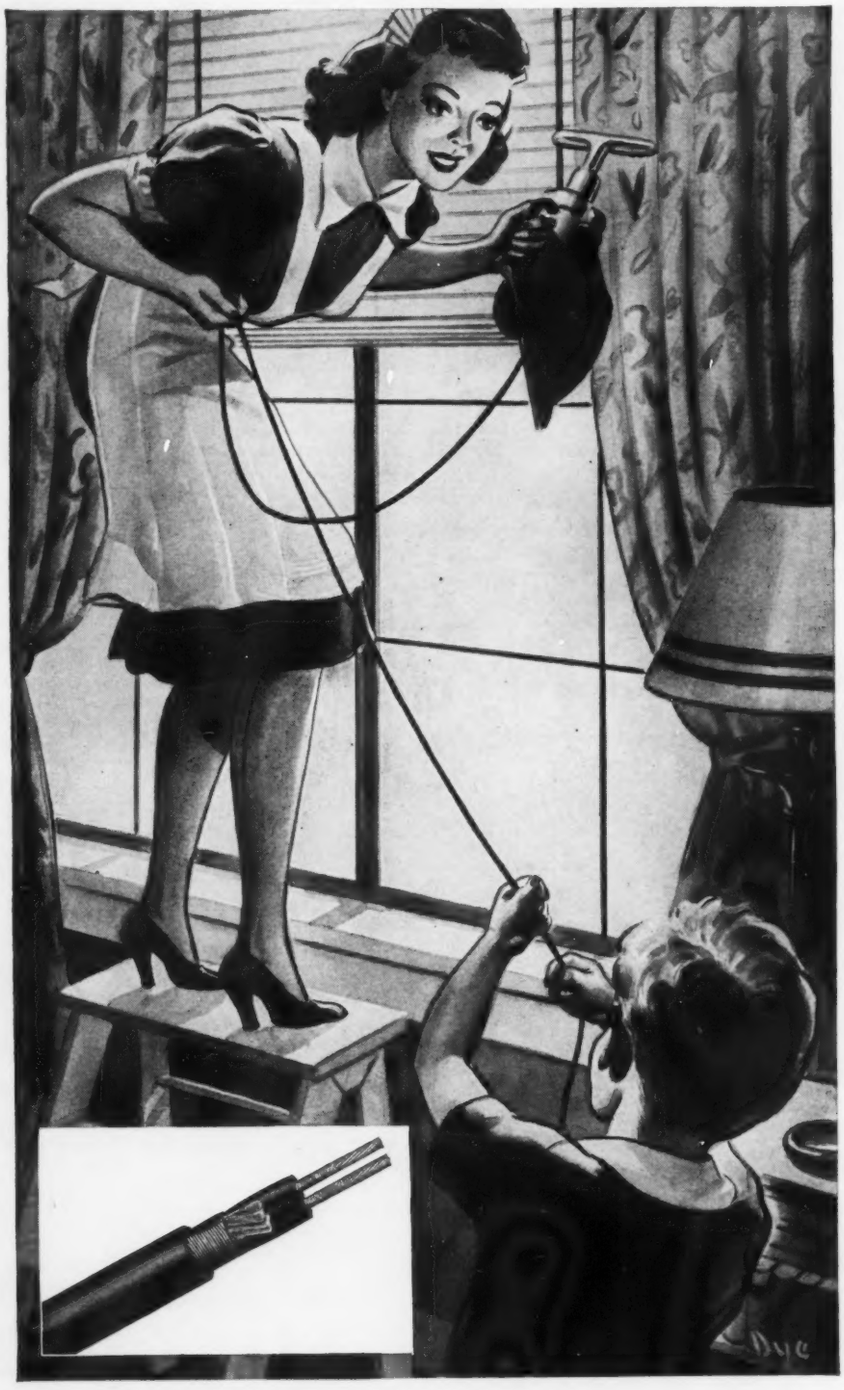
Transformer

Sola Electric Co. claims a more compact design and 115-volt output to within plus or minus 1%, on inputs of 95 to 125 volts, for a new 4.35-amp. compensated transformer. It offers 90% power factor throughout the input range and a virtually undistorted output wave. The manufacturer quotes price range as low enough to permit production-equipment applications.

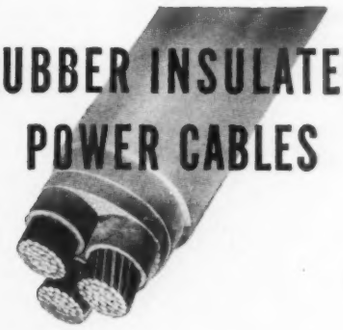
One-piece Copper Rotor

Centrifugal casting, a new method worked out by Fairbanks-Morse engineers, has led to the announcement of a one-piece copper rotor for squirrel-cage motors. Called "Copperspun," the one-piece rotor winding is a refinement for greater mechanical strength and ability to withstand higher pressures. Rotor bars and end rings are formed in one piece by pouring molten copper into a mold—spun at high speed—which encases the punched laminations, stacked and held under pressure. Afterward, all surfaces are machine finished. special fans are welded to the rotor core or shaft mounted, and the unit is dynamically balanced with great accuracy.

From Portable Cords to



RUBBER INSULATED POWER CABLES



OVER 60 TYPES OF ROEBLING ELECTRICAL WIRES AND CABLES

including:

Rubber Covered Wires and Cables: Code; Performance; and Heat Resisting; Plain Rubber 60% sheath Power Cable and 40% and 60% sheath Flexible Cords

Power Cables: Paper; Cambric; Rubber

Parkway Cable, metallic and non-metallic

Service Entrance Cable

Slow-Burning Wires and Cable

Weatherproof Wires and Cable

Police-Fire Alarm Cable

Appliance Cords

Annunciator and Blasting Wire

Network Cables

Magnet Wire

Welding Cables

And a wide variety of other wires and cables; either Standard or to Customer's Specifications

QUICK SHIPMENT

Prompt Service is available at all offices and warehouse points listed below, where large stocks of a wide variety of standard Roebling Wires and Cables are always on hand. Your request for information, prices or samples will be welcomed.

JOHN A. ROEBLING'S SONS CO. OF CALIF.
San Francisco, Los Angeles, Seattle, Portland

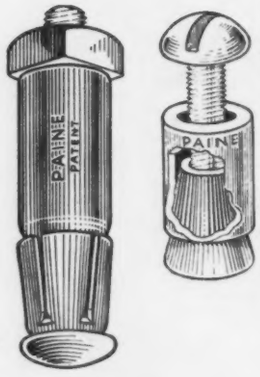
IF IT'S ELECTRICAL WIRE OR CABLE **ROEBLING** HAS IT!

DEPENDABLE ANCHORS by PAINE

For over 27 years Paine Products have been standard with Electrical Contractors, in the Building Trades, and among Maintenance men.

As specialists in ANCHORS of all types, sizes, and for all applications PAINE is your logical source—the answer to every anchoring problem from one manufacturer.

In addition PAINE supplies a complete line of Electrical Specialties including: Switch Boxes, Conduit Clamps, Outlet Boxes, Pipe Clamps and Hangers, etc., etc.



PAINE LEAD AND STEEL ANCHORS

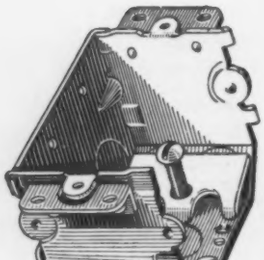
For holding strength, for quick, easy installations, for permanent trouble-free anchorage standardize on PAINE. The new re-engineered, re-designed ANCHORS have holding strength far beyond the ordinary anchor—still cost no more.

SPRING WING TOGGLE BOLTS

Press through smallest holes open in minimum space. Jaws operate independently, instantly opening upon clearing wall. Never catch or jam on irregular surfaces. Self-bracing, self-locking. The STRONGEST TOGGLE BOLT MADE! 18 types each in 60 sizes.

HANGER RING and BOLT

Galvanized or black steel. Well finished, snug-fitting with precision bolt and nut. 15 sizes.



SECTIONAL SWITCH BOX

Approved by Underwriters Laboratory, PAINE BOXES are GANGABLE—are supplied in any size or style to fit your requirements. Have nail holes in sides (a Paine feature) and are so designed that clamps do not interfere with the insertion of cables. There is ample wiring room with visible opening for Anti-Short bushings. Strong, rigid, convenient—sides pry off easily, snap on quickly. Japanned or galvanized finish. All styles, types and sizes.

PIPE STRAPS

Prominent bead, or center rib, gives this strap extra strength and greater holding power. Carefully cut from uniform gauge iron and with the same "snug fit" form of all Paine Pipe Straps.

PIPE HOOKS

Fit pipe snugly and more fully than any other hooks—holds pipe more firmly in position. High grade steel wire bent with a prominent head which facilitates driving of the spike.

SUDDEN DEPTH ROTARY DRILL

Tipped with diamond hard carboloy, actually drills smooth round holes in the hardest materials. Fast, silent, economical. Used in ordinary hand or electrical drills.

HANGER IRON

Fig.500A

8 sizes, all lengths, in rolls or long lengths. A uniform, well finished, perforated hanger iron in either black stock or galvanized finish.

Write for the PAINE CATALOG TODAY

The PAINE COMPANY

2975 Carroll Avenue
CHICAGO U. S. A.

J. J. SCHALLER, 423 Moline St., Los Angeles, Cal.
R. J. LEAHY, 486 Eighth St., San Francisco
A. S. KNIGHT, 3006 Western Ave. Seattle, Wash.
H. KAUB, 740 Steele St., Denver, Colo.

PRODUCT DATA

Anchors (721)

"Anchors and Power Line Accessories," a revised, 24-page James R. Kearney Corp. bulletin. Discusses fundamentals in selecting expansion anchors or screw anchors. Gives details on 2-, 3- and 4-way types. Complete data on steel-rod, pipe-rod and "no-rench" units. Clearly illustrated details on accessories.

Panel Boards, Breakers (722)

A Frank Adam Co. bulletin thoroughly describing a new line of panel boards and small breakers of the type which is replacing fuses, particularly at customers' load centers. Presents dimensions, weights, prices. Includes A-B-C sequence panelboards, general information on industrial column-type equipment, additions to list prices for increased mains and subfeeders, and suggestions for specifications.

Super-Sensitive Light Meter (723)

Considerable detail on a photo-electric footcandle meter capable of measuring light intensities as low as 0.005 ft.-candles. Color sensitivity curves for this G-M Laboratories device are given. Also presents data on new "Visitron" photo-electric cells, rated four times more sensitive than previous models. Among applications of the meter are: lighting surveys, colorimetry, light-absorption studies, reflection-factor measurements, photomicrography.

New G.E. Kitchen Line (724)

"Features of the new G. E. Electric Kitchen Line," an illustrative catalog showing various advantages of this handsome modern equipment. Accessories, time and work savers and many amazing new designs that will appeal to the housewife, are included in this attractive presentation piece.

Power Transformers (725)

"Portfolio of Unusual Power Transformers", published by Allis Chalmers. Large protographs of installations with terse captions. Deals with big units and special equipments which have recently been embodied in such units, many for the first time.

Safety Equipment (726)

A new catalog issued by the Davis Emergency Equipment Co. Products listed and described include body belts, safety straps, tools and tool buckets, climbers, line blankets, rubber gloves and rubber garments.

Megohmer (727)

A comprehensive bulletin on Model DM Megohmer, manufactured by Herman H. Sticht & Co. New triple color grading scale feature is completely described.

Certified Electrodes (728)

A 16-page booklet describing the certification process of weld deposit analysis and the welding procedure for the various stainless steels. Issued by The McKay Co., makers of McKay Certified Stainless Electrodes.

Time Recorders (729)

"The Graphic," a bulletin issued by the Esterline-Angus Co., outlines time recorders, and explains how to select, apply and use them. A very thorough booklet, with typical methods of actuating time recorders diagrammed.

Keep Posted for 1c

Your being right up-to-the-minute may have an important bearing on your success. New developments are appearing daily in your field—tools to help you do a better job. Are you abreast of them? You fall back a step when the other fellow is well informed about a subject of which you are ignorant. Manufacturers' publications are a quick, efficient way for you to keep posted on current events in your field.

Isn't it a bargain to invest 1c (the cost of a postcard) to help yourself achieve the increases in earning power to which you look forward? American industry is offering a remarkable service—free. ELECTRICAL WEST makes it easy for you to enjoy this service for your own. Check and mail the coupon below. That's all you have to do help yourself toward better performance and greater rewards.

Frequency Relay Control (730)

Compact folder outlining Frequency Relay Magnetic Control for A. C. Wound-Rotor Motors. Shows method of control with diagrams, proving greater accuracy with new operating results. This E. C. & M. booklet outlines solution for starting under all conditions of load.

Speed Reducers (731)

An illustrative booklet on Westinghouse types SH and DH speed reducers. Standard gear ratios range from 2:82:1 to 70:5:1, and capacities from one to 500 h.p. Include both single and double reduction types with varying standard ratios.

Distribution Transformers (732)

The Spirakore Distribution Transformers, single-phase, oil-immersed, are described in a new G. E. bulletin. New wound-core design is featured. Complete information is included. Transformers are available in 60 cycle ratings, 1½ and 3 kva., 7620 volts and below; and 2½ kva., 11,500 and 13,200 volts.

Lo-Maintenance Motors (733)

"Making Machine Tools Earn Their Way with Allis-Chalmers Lo-Maintenance Motors," a new 16-page booklet, well illustrated with a variety of installation photographs, showing application of Allis-Chalmers motors, and progress made in applying of motors to machine tools.

New Catalog (734)

The new 84-page Ideal Commutator Dresser Co. catalog, complete in every detail, listing new products. Included also are hints on commutator care, operation of direct current generators, definitions of electrical terms and many engineering tables.

Air Conditioners (735)

How a self-contained air conditioner may be adapted to the physical layout of an enclosure is illustrated in a new folder, "World's Fair Weather for Every Store and Office." Publication is distributed by Carrier Corp., shows diagrams for irregularly shaped rooms; square rooms, long and narrow rooms, and connected rooms.

Fluorescent Lamps (736)

New booklet on fluorescent lamps, published by Nela Park Engineering Dept. of G. E. Contains all of new engineering data on this new source. Lamp operating data, lamp performance factors, auxiliaries, operating characteristics, color quality and application considerations are described.

Measuring Apparatus (737)

Revised editions of Roller-Smith Co.'s catalogs, covering hand operating mechanisms and attachments and typical mounting arrangements for "Turbulator" oil-circuit breakers; new "Hipot" insulator and bushing tester; new applications of "Hipot" Potential Indicator; new type C Control Relays, and new classes 150 and 250 oil-circuit breakers.

Wire Measuring Machines (738)

New bulletin by Durant Mfg. Co. on wire measuring machines, showing enlarged line of counting machines for measuring wire and cable from .005" diameter and up. Illustrations, diagrams and tables ably describe different models, each of which has several variations.

Power Cables (739)

A new catalog describing rubber insulated power cables by Anaconda Wire & Cable Co. Physical and electrical characteristics for all types are given with complete section on technical data, coring details of control cables and other up-to-the-minute cable information.

Air Freshening Equipment (740)

Informative bulletin on home cooling equipment issued by Wagner Electric Corp. Illustrates and describes Wagner line of Air Freshening and Cooling Equipment.

Explosion Proof Motors (741)

The Louis Allis Co.'s 12-page booklet on their new line of explosion proof motors. New features carefully explained and completely illustrated. Interesting dissembled view of a motor is shown. Safety of this equipment is stressed.

NEW BOOKS

THE DISEASES OF ELECTRICAL MACHINERY, by G. W. Stubbings, Chemical Publishing Co., Inc., $3. Not a weighty volume, this is intended to instruct electricians and apprentices in the causes of defects in electrical machinery. It endeavors to make clear how defects are located and rectified. The first chapters deal with fundamentals, testing, bearings, commutators, and thereafter with particular types of motors and generators. The treatment is not mathematical and makes use of diagrams of very simple type.

PRACTICAL ELECTRIC ILLUMINATION AND SIGNAL WIRING METHODS, by Terrell Croft, revised by George H. Hall, published by McGraw-Hill Book Co., Inc., available at McGraw Hill Book Room, 883 Mission St., San Francisco, $3. The 1937 National Electrical Code, and latest information issued by the Illuminating Engineering Society, have been incorporated into the revised, 351-page illustrated edition. Developments in the lighting field are carefully considered, especially with reference to wiring for incandescent lamps of higher effieciency and for high-intensity mercury-vapor lamps and sodium-vapor units. New material also deals specifically with the illumination of ball fields, race tracks, tennis courts, and similar areas.

"DIRECT CURRENT MACHINERY," by Hempstead S. Bull, John Wiley & Sons, Inc., $3. This is a new text directed at the electrical engineering student. It includes numerous problems. Halftone illustrations are minimized on the assumption readers will get these from lantern slides, manufacturers' bulletins and other forms of modern visual education. Although dealing in detail with machinery problems, the scope is broad enough to include a chapter on "Rating and Costs" and another on treatment of distribution circuits and networks. Temperature coefficients and wire and magnetization data are appended.

SAVE TIME! USE THIS COUPON

To keep posted, simply circle the items in which you are interested, cut out the coupon (it can be pasted on the back of a postcard) and mail to:

ELECTRICAL WEST, 883 Mission St., San Francisco, California

Please send me the following CIRCLED items:

701	702	703	704	705	706	707	708	709	710
711	712	713	714	715	716	717	718	719	720
721	722	723	724	725	726	727	728	729	730
731	732	733	734	735	736	737	738	739	740
741									

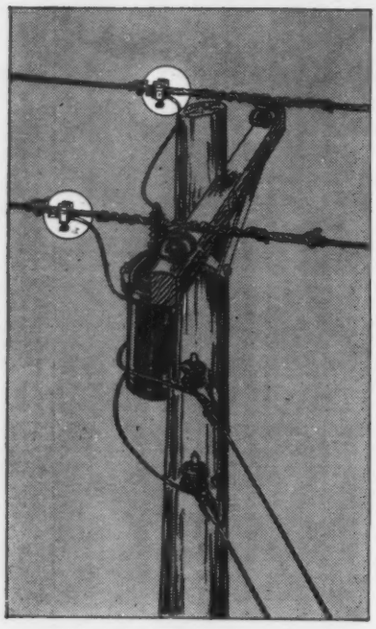
Name ..... Title* .....

Company* .....

Address .....

* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Modernize
YOUR
DISTRIBUTION
PRACTICE—



ACSR rural line transformer pole.

Connections made over armor rods.

Straight-thru dead ends of hard drawn copper secondary.

RELIABLE FLIP-ON TAP CLAMPS for ACSR over armor rods combine high strength with light weight and make fine mechanical and electrical joints. Very easy to install. Very low in cost.

Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

LETTERS

Timely Comments

DEAR SIRS:

I have just read with considerable interest Mr. Lisberger's comments on "Today's Trends" in the May issue of ELECTRICAL WEST. Permit me to say that these timely comments have been very helpful to me and I am sure they will be to many others who have to design, construct or operate electric distribution systems.

L. M. SMITH
Alabama Power Co.
Birmingham, Alabama

Serious Problem

DEAR SIRS:

The article "Who Pays the Reparations for Price Wars?" by E. F. Watkins in the June issue is of special interest to me. It is my personal opinion that the trade press can do a great service for industry by preaching the principles brought out in this article, both editorially and by frequent publication of similar articles.

It has long been a conviction with me that the destructive forces within industry of exactly the character and type described in this article, is one of industry's very serious problems. I do not know the answer . . . .

F. C. KEARNS,
The Texas Company,
New York, N. Y.

Infra-red Drying

DEAR SIRS:

In the June issue of ELECTRICAL WEST, page 112, is an article on infra-red lamp drying and heating. This article may be quite correct insofar as it applies to G-E lamps, but it is most horribly wrong as regards the use of NALCO lamps.

In the first place such an article is detrimental to a new and successfully growing business in that it misleads the potential buyer. The author refers to two reflector manufacturers who are trying very hard to produce a reflector that will equal the original type made for use with NALCO lamps. Ford has been using infra-red drying for several years, using only NALCO lamps. The Chrysler company is installing a 400-lamp dryer in this territory now which will be equipped with InfraRed Devices Co. reflectors and NALCO lamps.

Several installations are in or are going in for both heating and drying here in southern California. It is my hope later to be able to give you an article for publication with photographs of some of these.

I. N. FRANKLIN
Infrared Heating & Drying Devices
Los Angeles, Calif.

Surprise

DEAR SIRS:

With reference to the map, page 56, in your June issue, I was surprised to learn that we (Utah Power & Light) have been absorbed by Idaho Power. Except for this error, your June issue is a masterpiece.

K. W. BROWNING
Sales Division
Utah Power & Light Co.

The reason for lumping Utah and Idaho together in the Army map may be put down as one of the "trade secrets . . . not divulged to the public" to which Col. Stanford referred in his article, "Defending the Pacific Coast." Intended to show communications areas as the Army groups them for its purposes, the map omits several important Western systems.—ED.

VENT-A-HOOD . . . sensational new patented kitchen ventilator—not a fan—grease trap and centrifugal exhaust unit removes cooking odors from kitchen before they can invade other parts of the house—prevents greasy vapors from settling on walls—saves housework. Keeps kitchen cool. Biggest innovation since mechanical refrigeration. Selling by the hundreds wherever shown. Dealers and sales representatives wanted for unassigned territory—write or wire quick for literature and liberal proposition.

The VENTAHOOD Co.
2808 COMMERCE STREET
DALLAS, Dept. E TEXAS

TELESCOPE BM SYSTEM

CONNECTORS AND COUPLINGS
Cadmium Finish
for Electrical Metallic Tubing

B-M Connectors and Couplings make the neatest installation. No nuts to tighten, just two squeezes with our Indenter and the fitting is securely fastened to the tubing.

B-M fittings are so much lower in price that the savings on the first job will more than pay for the Indenter required. Our tools and method of fastening the fittings to the tubing are patented, and we limit the license of our tools under these patents to the installation of our fittings only.

Listed by Underwriters

No. 605. Price $1.35

DISTRIBUTED BY:
THE M. B. AUSTIN CO., Chicago, Illinois
CLAYTON MARK & CO., Evanston, Illinois
CLIFTON CONDUIT CO., New York City
GENERAL ELECTRIC CO., Bridgeport, Conn.
THE STEELDUCT CO., Youngstown, Ohio
TRIANGLE CONDUIT & CABLE CO., Elmhurst, New York City
ENAMELED METALS CO., Pittsburgh, Pa.
NATIONAL ENAMELING & MFG. CO., Pittsburgh, Pa.

BRIEGEL METHOD TOOL CO.
GALVA, ILLINOIS

COLT NEWS

COLT ANNOUNCES THEIR NEW MULTI-BREAKER LOAD CENTERS

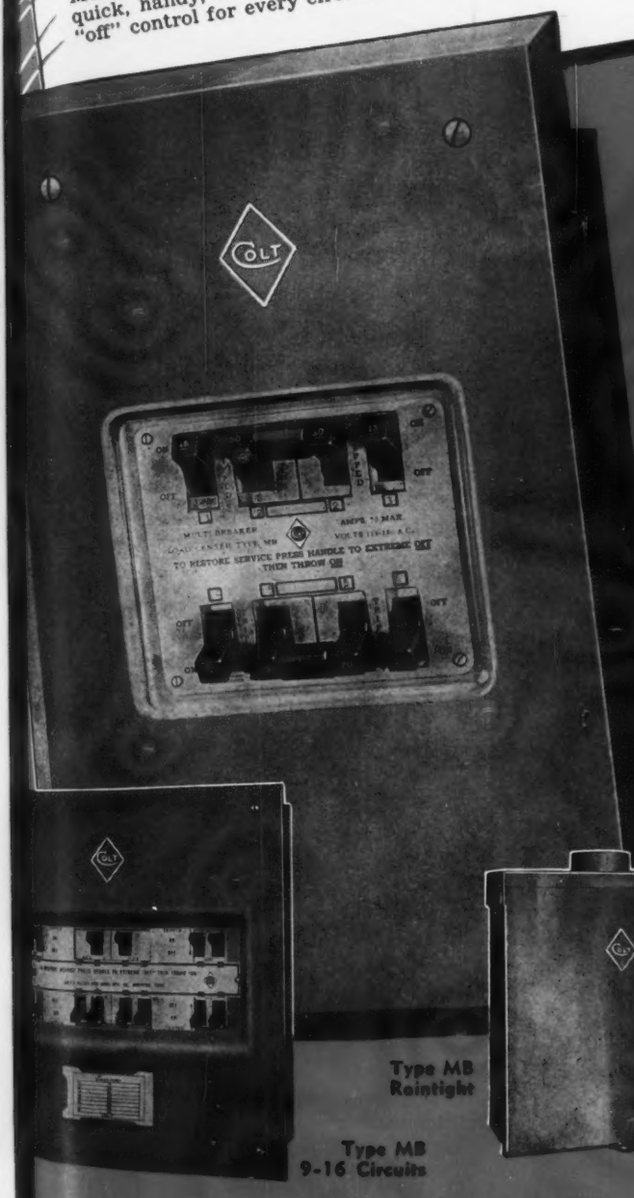
Famous Electrical Line Now Includes Latest Home Protective Devices

Right up to the minute is this new Colt line of protective devices . . . the Colt Multi-Breaker. Modern homemakers demand finger-tip control of lighting circuits, electrical appliance, refrigerator and range circuits. That's exactly what the Colt Multi-Breaker provides . . . quick, handy, efficient "on" and "off" control for every circuit in the home. Attractive cabinets and smart, moulded jet-black handles harmonize with today's kitchens . . . add a touch of efficiency to every home.

The simplicity of the Colt Multi-Breaker will appeal to your customers . . . especially the women. Absolutely safe . . . completely automatic.

the Modern Way

TO PROTECT A MODERN HOME



Type M

Type MB
1-8 Circuits

Type MB
Raintight

Type MB
9-16 Circuits

Type M
Raintight

Complete Line of Types M..MB..MBM Now Ready

Available for 1 to 16 Circuits

Breaker Ratings 15 to 50 Amperes

New and bigger sales . . . an entirely new field opens up for you with the new Colt Multi-Breaker. The modern home builder knows what he wants in the way of electrical equipment . . . and he wants automatic, finger-tip control of his home circuits. That means he wants Colt Multi-Breaker . . . and that means bigger sales, more profits for you. These new Colt devices are as modern as tomorrow. The line is complete . . . ranging from the compact type "M" up to the sixteen circuit type "MB" and the combinations known as type "MBM".

EASY TO SELL... and EASY to Install

Nothing could be simpler than these new Colt Multi-Breakers. Simple in design . . . easy to explain to prospects . . . quick to install . . . attractive in appearance. Their features will sell them almost on sight.

Yes Sir! I want full data on your NEW COLT MULTI-BREAKER. Send detailed information on all models, including prices.

COMPANY_____

ST. & NO._____ STATE_____

CITY_____

BY_____

COLT'S PATENT FIRE ARMS MFG. CO.
Electrical Division Hartford, Conn.

COLT *Multi-Breaker*
LOAD CENTERS

ELECTRA'S HUSBAND

They're Called Salesmen

WITH ELECTRA on a month's trip East, life at home has been calm and peaceful. But not so at the office. Harken to both ends of the following phone conversation, shortened by half to fit the space allotted by the editor.

"Good afternoon. This is the Lectric Material Company," says a voice into my ear.

"Hello, is there anyone there who can help me with some catalog numbers?"

"I will. Who's talking?"

"Galpin of CBA. To whom am I speaking?"

"A. M. McMususus."

"I didn't catch it. Whom did you say?"

"McMususus."

"It doesn't matter. Skip it. I'm writing a specification to revamp some street lighting and would like the catalog number of a cross arm to bring down the street lighting lines to a street head on a bracket. I want the catalog number for both the single and two-insulator extension."

"What's that? What kind of an extension?"

"I need the catalog numbers for both a single and double-insulator cross arm extension bracket to enable me to get the wires from a top position arm around outside the wires on the secondary arm."

"Well, I don't know what you're talking about and our salesman who does isn't in right now."

"When will he be in?"

"Not until late."

"How about tomorrow?"

"He's leaving on a trip up country in the morning and won't be back for a week."

"Is he around town?"

"Yes, but I don't know where."

"Does he call in?"

"Well sometimes."

"If he calls will you have him phone me?"

"I'll try to remember."

"Good-by."

"Good-by." And the crash of the receiver on the other end nearly knocked my ear off. So for another try from another supplier. more dialing.

"Hello."

"Hello. Is this the Electrical Supplier Company?"

"Yes. What can we do for you?"

"I'd like to talk to a salesman."

"What kind of equipment?"

"Street lighting hardware."

"Okay." And there followed an exasperating wait.

"Hello, this is Essmnnn."

Remembering the former difficulty over names, the specification writer let it pass.

"I would like to get the catalog number for an extension to be placed on a cross arm to bring the street lighting circuit from the top pole position around the secondaries to a street lighting head on a bracket."

"Oh, I don't handle that stuff."

"Is there anyone there who can give me the information?"

"I don't know."

"Well, what can we do about it?"

"Oh! Just a minute." (Click, click) "Operator." (Click, click) "Hello, operator." (Click, click). He was trying to signal his own switchboard girl. "Miss Jones, Hello, hello, HELLO!"

"Yes," and Miss Jones had acid in her voice.

"Will you transfer this call to Mr. Sasssss."

Silence and the passage of time.

"Hello." It was the operator.

"Hello, Miss Jones," and my own voice was just a little tart.

"He doesn't answer."

"Thank you. What can we do about it?"

"What was it you wanted?"

"Just some information so I could place an order."

"Well he isn't in now."

"Is there any way I can see him today or tomorrow?"

"I'll ask him to call you."

"When do you think that will be?"

"Oh, I don't know. He may be going away tomorrow. What's your number?"

"Exbrook 7654."

"All right. I'll tell him to call you in the morning."

At 9 o'clock the next morning, both salesmen appeared personally. And neither could give me the catalog number requested. One salesman insisted on an automobile ride around the streets to look for something similar. I protested that I knew what I wanted and only needed two catalog numbers.

So we took a nice ride, examining street lighting installations without finding the particular extension. We stopped at the power company office and pored over batches of drawings, but no catalog numbers were forthcoming. By noon we were back at my office, still without the catalog numbers.

As a last resort the salesman called his home office—and got the catalog numbers. Did I say salesman? Excuse it, please.

ALL this calls to mind a piece I read in one of the magazines the other day. It was only a matter of time I suppose. The epoch of the robot jumped three leagues closer. Man has only himself to blame if some day he finds himself displaced by mechanical gadgets that do more reliably what he should have done all along. But he persists in being ornery and thus invites his own displacement by a machine which won't talk back.

You would think that the salesman would be the last to hear the oncoming footsteps of the mechanical man to take *his* place. But here it is. One of the most prominent appliance manufacturers has introduced a robot salesman —a phonograph recording.

Go into one of the stores selling this manufacturer's line, and even if you find nobody at home but the typist, you can help yourself to a sales talk, just as you would groceries in a self-help store. And you don't have to put a nickel in the slot either.

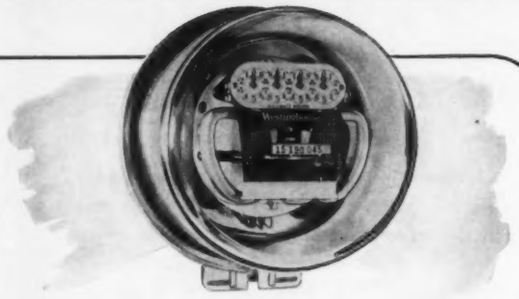
Records have been made to do the sales persuading, even if the sales people are struck dumb. Handy, what? Standing before the door of a refrigerator, you can turn on the record, and while the thing talks, you can give yourself a demonstration. The only thing lacking is an arm that thrusts itself out with a fountain pen and order blank when the record says, "Sign here." That may come in time.

This should save the salesman all that boresome tedium of sales training, attendance at sales meetings, study, practice of a demonstration routine, yes, even thinking. With the last bit of gray matter he has left, Mr. Salesman might wonder whether the boss won't even decide he doesn't need a salesman any more.

It's Gold . . .

The great value of gold in making fine jewelry is not so much its beauty as its *Permanence*. Gold does not rust or corrode . . . is not affected by air or moisture. That's why the registers in Westinghouse Meters are *Gold Finished*. It means no register corrosion–permanently low friction.

. . . THAT PROTECTS LONG TIME ACCURACY



SINGLE OR POLYPHASE

The growing use of polyphase metering presents no problem to Westinghouse. Polyphase meters are compact, require no new mounting arrangements, and bring you dependable, long time accuracy.

Send for booklet B-2138 — with chart that helps you select quickly the right meter for every condition. Address Westinghouse Electric, East Pittsburgh, Pennsylvania. Dept. 7-N.

What this means in terms of Lower Operating Costs

Savings made in meter operation can be a mighty important contribution to profits, and build customer good will besides.

Because of their many *extra* points of quality, Westinghouse Meters have earned an enviable name for Long Time Accuracy — accuracy that is sustained, without periodic bearing replacement — with a minimum of attention.

You'll find this reputation for low-cost meter maintenance proved by your own records, and by the records of other power companies. You can safely buy your meters by these comparative figures.

J-40212

Westinghouse *Long Time* Meters

W WESTINGHOUSE ELECTRIC

by BTC

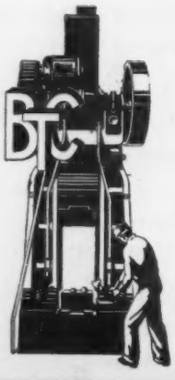
The catalog copy for the above clamp states: "Heavy Duty Trunnion Type Strain Clamp. S.A.E. 1035 Copper Bearing Steel. Hot Dip Galvanized. Offered for all sizes A.C.S.R., Copper and composite conductors, light in weight but with mechanical slip strength adequate to the most severe service."

Those are cold facts. But let us add a little; facts that are not stated in catalog copy.

BTC takes pride in the part they have played in the development of drop forged Hi-Line hardware. We wish to thank the utility engineer and insulator manufacturer alike for their advice and guidance in the development of this line; for it seems to us that this entire line of Hi-Line hardware has been built to meet the approval of the man who is responsible for its use.

We only ask that these factors be considered when Hi-Line Hardware is chosen.

Through your insulator manufacturer only.



BEST QUALITY FORGINGS

If you have good eyes, take a squint through the fog we are using for a photograph in the above illustration. The boy holding the business end of that hammer is an honest to goodness blacksmith and he could really lay it down on that anvil with man power.

The photograph in question (you should have seen the one we started with) is of ancient vintage and was actually taken in the early days at The Brewer-Titchener Corporation some thirty or forty years back. Which all goes to show that even though we sport the finest electrically driven hammers in the industry today; there was a time when the old fashioned smithy had his place with us.

Established 1834

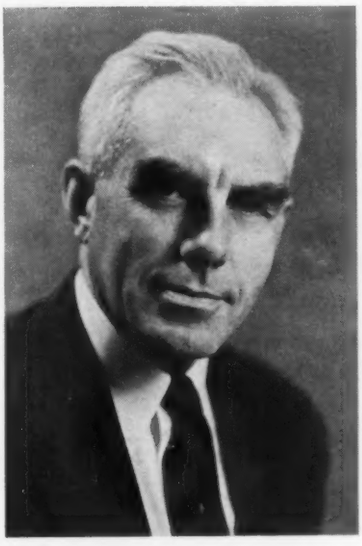
High Tension Suspension Line Hardware

THE BREWER-TITCHENER CORPORATION

More Goods for More People at Less Cost

What industrial electrification has meant to American economic and social progress

By E. O. Shreve*



TREMENDOUS progress has been made toward increasing the standard of living in this country and every industry has contributed. Yet, as we analyze the advance that has been made we see that in practically every instance electricity and electrical developments have played an outstanding part. They have made possible increased quality of product with greatly reduced cost, creating opportunity for wider markets and greater employment in many industries. Let us look at a few of our major industries and see some of the ways in which electricity and electrical developments have done their great work.

Consider the aluminum industry—it was not so many years ago that aluminum cost $8 a pound. Very few people were able to afford aluminum pots and pans. But a new refining process using electricity reduced the cost to twenty cents a pound and opened up a wide market for aluminum products. The average yearly kw.-hr. consumption over the last three years in this industry is approximately 1,500,000,000.

This electrolytic method not only brought additional benefits into the household, but also increased the number of people employed by the aluminum companies from only a few hundred at the time of its advent to around 25,000 men at present.

One of the basic and most important industries is the steel industry, so let us review the part that electricity has played in its development.

Prior to 1906, electricity was used very little in the steel mill. An average steel mill at that time was relatively small—the reciprocating engine was the generally accepted drive. The rolling mills were hand controlled and there was very little flexibility in operation. The finished steel produced at that time with few exceptions was only six or seven feet long and the steel manufacturers were unable to produce the many varieties of steel for which there was an apparent demand.

Application and designing engineers of electrical equipment manufacturing companies, working very closely with the steel companies, began to solve some of their problems by the proper application of electrical equipment. The use of electric motors and control soon gave the steel industry the much needed flexibility in manufacture, and electrical equipment began making possible the operation of continuous hot-strip mills on an economical basis. Improvements continued and today the application of electric drive and control to the hot-strip mill has made it possible to roll steel 96 in. wide at speeds up to 2,000 ft. per minute. It would be impossible to carry on this operation with any other but electric power. Remove the electrical equipment, and no up-to-date steel mill could operate.

The tremendous part that electricity has played in the production of steel is brought out still more clearly in the case of cold-strip mill which is used to still further reduce the thickness of the steel strip. Such a mill requires very close control of operation because the strip must be held at constant tension and any great variation would make this operation impracticable. Again, this problem was met by the application of electrical equipment. The rolling proceeds at speeds of 1,800 ft. per minute and the sheet must be rolled to a gage within close tolerances. Therefore, it is necessary that the gage be measured continuously while the metal is passing. This problem was solved by an electric micrometer which has been developed for this particular operation.

Deprived of electricity, the cold-strip mill which reduces by many dollars the cost of steel would soon disappear, together with its big brother, the hot-strip mill. Here, it is not a question of doing a better job with the help of electrical equipment, but it is the problem of doing it electrically or not at all.

Electric heat also has found an important place in the steel industry in the melting, refining and heat treatment processes. It has the advantage of giving precision control, cleanliness, and freedom from spoiled products. It has been applied with great success in the production of better grades of steel, particularly alloy steels.

The steel companies certainly are to be complimented in the great advance which they have made in bringing out new kinds of steel and reducing costs through the use of electricity and electrical equipment. Their efforts, combined with the contributions of the electrical industry, have made it possible so to broaden the market for steel products that today the steel companies employ approximately 500,000 persons, compared to 275,000 in 1907. The average man hours required to manufacture a gross ton of finished steel product in 1904 was at least 117; now it is but 36. The normal annual kw.-hr. used in the steel industry is from nine to ten billion. Roughly, it requires 200 kw.-hr. to produce a ton of steel. The price of steel has been reduced by 46% since as recently as 1923. This price reduction, coupled with the new products which they have been producing, has had an enormous effect on other industries in the way of quality of product, cost and employment.

This has had its effect in the automotive industry. Everyone will agree that the reduction in the cost of steel and improvement in its quality, together with the electrification of the automotive industry, has had a far-

* Extracts from an address before the Pacific Coast Electrical Assn., Pasadena, May 25, 1939.

reaching effect in producing the high quality automobiles that we can purchase today as compared with the cars which could be purchased for the same amount of money in 1923. Also, it will be interesting to note the number of passenger car owners has increased from 13,480,000 in 1923 to slightly over 25,000,000 in 1938. The number of wage earners associated directly with the automobile industry, including automobile factory workers, tire and accessory factory workers, truck drivers, taxi drivers, gas station attendants and the like, has increased from approximately 3,000,000 in 1923 to an estimated 5,700,000 in 1938. In addition to the great increase in quality, the cost for comparable passenger cars has decreased at least 30% between 1925 and 1938. Undoubtedly electricity has been the chief contributing factor in making this advance possible.

Employment Increased

Again, although in 1925 it required 230 man-hours to produce a car as against only about 195 now, as has been indicated, the total employment increased materially. In 1923 it required about 125 kw.hr. to build an ordinary car; now for a comparative car 400 kw.-hr. are used.

In the petroleum industry again electricity is deserving of considerable credit in the development of one of the largest and most important segments of our economy. The growth of the American petroleum industry has been very rapid, and although this industry always has had a high degree of mechanization, the advent of modern electric equipment has undoubtedly contributed a great deal to its present stage of efficiency.

In few industrial fields have applied science and engineering methods been so aggressively developed and utilized, and the progressive use of electricity in the oil industry is outstanding, particularly in the art of refining.

Fire Hazard Elimination

Direct acting steam pumps were originally used for pumping condensing water, crude oil, and other products of refining. This was done largely to eliminate the fire hazard, and since large amounts of steam were necessary for the distillation processes, the steam required for pumping was considered on an incremental basis and was apparently economical.

The first application of electric power in the oil refineries was for lighting, which was used to avoid fire hazards caused by open flame torches or gas lighting. However, with the advent of the induction motor and centrifugal pump, electric power began coming into use for water pumping. Later the explosion-proof motor came into being and again widened the field of potential use of motors to produce safety conditions. Today oil refineries perform approximately one-half of their operations with electric motors.

It is interesting to note that of the total of approximately 1,170,000,000 kw.-hr. of electric power used annually, approximately two-thirds is purchased power and one-third generated privately.

Recent developments in the refining industry indicate that further use of modern electric control devices will be found very profitable and will contribute to further advancement in the refining art.

Just as electricity has contributed to the steel industry in making it possible for the average man to own an automobile, so has electricity contributed to the oil industry in making it possible for the people to run their automobiles at the lowest possible cost for power fuel, or gasoline. The average retail price of gasoline, excluding sales taxes, in 50 representative cities has declined in the past fifteen years, during which period a progressive use of electricity has been made, from 21.06 cents per gal. in 1923 to 14.07 cents per gal. in 1938.

Gasoline Statistics

In 1923 the refineries produced 181 million barrels (42 gallons each) of gasoline. In 1937 they produced 559 million barrels of gasoline. The number of employees increased from 67,000 in 1923 to 83,000 in 1937. So again, you can see that electricity and the application of electrical equipment is contributing substantially to the American public, both in economic and social welfare.

Let us next review the textile industry. Here we have one of the oldest industries in the world. In the United States it was started with the landing of the first settlers.

Constant improvement in textile machinery, in electrical equipment and new application of electrical drive and control, have made it possible for the textile manufacturer to produce higher quality cloth at lower cost.

A study of statistics shows that from 1910 to 1936, the possible production per man-hour for carded broadcloth was increased 49%; for sheeting it was advanced 55%; for print cloth 51% and terry cloth, 151%. It is difficult to obtain figures showing comparative costs of finished textile products; nevertheless, we know that today the average person is able to purchase a much better garment for the same money that was paid in 1910.

The rayon industry which started in this country about 1910 has shown one of the greatest advancements and expansions of any of the industries in the United States.

During the first ten years of this industry, it produced an average of 8,700,000 lb. per year. In 1938, its production was 327,000,000 lb. This increase must be attributed in a large measure to the efforts of electrical manufacturers in being able to produce motors and control for the production of this synthetic fibre. It would be impossible to operate a rayon plant with the old method of mechanical drive or group drive because of the high and accurate speeds which must be employed.

Textile Industry

The knitting and hosiery industry would be in a bad plight today if it lost the adjustable speed motor with automatic control.

It goes without saying that the modern methods of manufacture made possible by the use of electrical equipment in the textile industry have helped improve working conditions such as safety and health in the mills.

The December, 1938 U. S. Department of Labor report indicates a considerable fluctuation in employment in these manufacturing industries. In most cases, however, for every group under this classification, an increase in 1937 over the figure for 1924 is shown. This is particularly true of those industries which utilize the products of the textile industry, such as men's clothing, women's clothing, shirt and collar manufacturing. The net result of this continual seeking for new developments and modernizing of equipment, which is accomplished only by the cooperation of the textile mills, the power companies, and the electrical manufacturers working together, is to promise even greater strides and progress for the coming years, which would result in even more employment, higher wages and lower cost products with the resultant greater distribution of products among all classes of people in the country.

Paper Industry

Let us see what part electricity has played in the paper industry. It was not long ago that "paper" meant nothing more than our daily newspaper or the material used by the butcher to wrap our meat in, but witness the changes wrought by a few years. Today the average American citizen makes use of paper in many forms. His house is partially built with it. His electrical appliances are quite likely insulated with it. His cigarettes are wrapped in paper, his breakfast food is wrapped in two kinds of paper to protect it

from moisture, and everything he eats comes wrapped in paper in one form or another. Our letters and all our correspondence are printed on paper and our money is made of it. In fact, this amazing product is so flexible that the average individual has difficulty in distinguishing paper products from other materials. Bags, brief cases, wallets, covers and many articles which appear to be beautifully grained leather, are paper—even shoes and collars are not exempt. Paper and its derivatives are accepted without thought—like the air we breathe—and add immeasurably to our health, our comfort, and to our high standard of living.

Paper Consumption Increase

The use of paper in the United States has increased from 69 lb. per capita fifty years ago to 200 lb. per capita today. This increase can be largely attributed to the alert and progressive efforts of the paper industry working in cooperation with the electrical industry to modernize plants, speed up production and make a better grade and more varieties of paper at a greatly lowered cost.

For example, in 1920 paper machine speeds were 600 to 700 ft. per minute. One machine has recently reached the unheard-of speed of 2,000 ft. per minute, made possible by accurate speed control obtained through the application of electric power. Most machines in the industry have been speeded up, demanding greater horsepower; synchronous motors have replaced steam engines and induction motors on beaters, Jordans and pumps; the motor has replaced the waterwheel for grinders and has increased in size from 600 hp. to 4,000 hp. with little consideration being given to anything but the synchronous motor.

Use of Turbines

Process steam is used in large quantities in the paper mill and in the interest of economy and a steam-power balance, turbines have practically replaced steam engines and waterwheels, most of these being of the single or double extraction, condensing type with a governor developed purposely to meet the varying demands of steam and power, and maintain constant frequency.

With the enormous amounts of money that have been spent during the past twenty years in this billion dollar industry, the number of wage earners has remained fairly constant but wages per man have increased. During this time, total production has increased 75%. However, this increased production, resulting in lower paper costs, has increased the employment in those industries which use paper as their raw material. Those industries, such as box and paper product manufacturing, printing, publishing, etc., while fluctuating considerably, have shown a steady increase in employment from 1924 to 1937 of about 10%. The annual power consumption in 1920 was approximately 2 billion kw.-hr., 1929—7 billion, 200 million, and in 1938 upward of 9 billion kw.-hr. with about 40% purchased power.

These facts prove conclusively that the use of electricity and electrical equipment in industry has had a far-reaching effect toward bringing greater employment and much more enjoyment and comfort to the American people.

The story of the development and use of electricity is outstanding. In my opinion it has been the major factor in realizing the slogan "MORE GOODS FOR MORE PEOPLE AT LESS COST." It has made possible the steady widening of opportunity for more people to possess not only electrical devices but goods from many other industries and thus has contributed and is contributing substantially toward making the world a better place in which to live.

Storeman Lights His Corner

TRAFFIC accidents at bustling downtown intersections due to insufficient street lighting is a problem that is confronting many business men today. One situation has been taken care of by Herbert S. Auerbach, president and manager of the Auerbach Co., Salt Lake City department store. Auerbach, who has always taken a keen interest in street lighting, is responsible for the intersection at Broadway and State streets being perhaps better lighted than any intersection of its size in the United States.

In size it can be compared with a baseball diamond, being 95 x 95 ft. from curb to curb, or 130 x 130 ft. from building line to building line. Being one of Salt Lake's busiest intersections, it is bordered on all corners by modern buildings, including the Auerbach store on the southwest corner.

After experimenting many months with different types of street lighting, Auerbach decided upon a combination of sodium vapor and mercury lamps. The installation consists of a cluster of seven 10,000-lumen sodium vapor lamps suspended on cables 16 ft. above the center of the intersection, along with fourteen 400-watt mercury lamps suspended from cables above the sidewalk around the buildings bordering the intersection.

The new installation, along with the older arc street lighting system, gives an average illumination of six ft.-candles on the entire intersection.

Initiative of Auerbach's store, Salt Lake City, resulted in an intersection which, for its size, is among the best lighted in the world. Seven sodium-vapor and 16 mercury units are installed

Appliance Selling—College Taught

Los Angeles sets up curriculum in electrical merchandising

By Chester O. Broders

FEDERAL, State, and local cooperation in making funds available for employment training in the distributive occupations has led to the establishment of a cooperative undertaking in salesmen's training between the Electrical Development League of Southern California and the Los Angeles city schools. This is probably one of the most unusual classes in the annals of cooperative training and shows what may happen in any industry or locality when the schools and business get together.

Early in 1938 The Electrical Development League of Southern California, through E. E. Adams, contacted the Coordinator of Distributive Occupations of the Los Angeles city schools, asking these questions: "Isn't there some way to get new blood into the electrical industry? Isn't it possible that there are graduates from some of the Junior Colleges who would like jobs selling electrical goods?"

Standing are students of L. A. City College. Seated, left to right, J. J. Stigman, Bureau of Power & Light; C. O. Broders; W. R. Blackler, State Dept. of Education; Victoria McAlmon, placement coordinator, L. A. City College; F. L. Hockensmith, Elect. Dev. League; Z. H. LaPrade, B. P. & L.; Graham Holabird, president of League; Fay Newsome, home economist, B.P.&L.; E. C. Adams of League standing at extreme left

Prior to that time work had been done with the League in establishing a salesman's clearing house through the League. When a dealer was in need of a competent salesman he contacted the League. The League maintains an approved list of applicants available who had been tested and given their stamp of approval. The difficulty was that suitable material was not often available.

A conference was arranged with the placement director at the Los Angeles City College, preliminary details were worked out. Why shouldn't there be a two-year training program for Salesmen in Electricity? Why shouldn't salesmen be trained the same as nurses, engineers, secretaries, or bookkeepers? Why shouldn't they go through a 'try out' period?

A luncheon meeting was held at which the following information which had been prepared in mimeographed form was discussed:

A Proposed Semi-Professional Curriculum in Electrical Equipment Merchandising

The aim of this course is to train young men for sales positions in the electrical equipment and appliance field, who are well grounded in the fundamentals of business, the social sciences, and most particularly in salesmanship. Sound training in electricity with special emphasis upon its practical application in the sale and servicing of electrical equipment is another important objective.

With the cooperation of the electrical equipment industry in this area, approximately fifteen young men will be selected each semester to take this training.

Cooperative training, as indicated in the curriculum below, will be offered in the second, third, and fourth semesters. By "cooperative training" we mean the student will be assigned to some electrical equipment concern in Los Angeles where he will have an opportunity to observe the principles learned in the class room in practical operation, as well as to acquire some of the sales and technical techniques used in their performance. For the time spent in "the field" the student will receive an hourly rate of pay plus college credit.

Young men with the following characteristics can succeed in this type of work: (1) Pleasing personality; (2) Ability to mix well with people; (3) A mature and serious attitude toward life; (4) Mechanical mindedness and manual dexterity are assets, though the lack of them are not necessarily serious handicaps; (5) A specific interest in electricity and its application to mechanical equipment also seems important.

FIRST YEAR

First Semester	Second Semester
English	Public Speaking
Accounting	Typing
Advertising	Retail Merchandising
Business Mathematics	Psychology
Economics of Marketing	Electricity
Modern Thought and Expression	Cooperative Work
Physical Education	Physical Education

SECOND YEAR

First Semester	Second Semester
Salesmanship	Technique of Electrical Equipment Salesmanship
Electricity	
Political Science	Operation and Demonstration of Electrical Equipment
Health	
Cooperative Work	Electrical Servicing
Physical Education	Cooperative Field Work
Electives	Physical Education

In each case the course was to be worked out so that it would meet the needs of those to be specifically engaged in merchandising electrical equipment.

It will be noticed that the cooperative "field work" was to start in the second semester. A plan was worked out whereby this would include nine hours of work per week in each of the second and third semesters, but with twenty-one hours per week the fourth semester.

The program looked good on paper, but to try it out it would be necessary to wait until students had gone through the two-year course. At that time there were electrical engineering students unplaced, likewise merchandising students. If we could get a few of these together to try out the training program set up for the fourth semester.

Engineering and merchandising graduates and fourth semester students were rounded up. The League passed on seven of them as suitable material and the try-out was started.

Training Course

A 14-week training course was provided these students of the Los Angeles City College, using as instructors members of the electrical industry—E. C. Adams and Walter L. Stickel of the Electrical Development League, and J. J. Stigman, Vernon Sheblak, J. W. Doan, T. H. Shepherd, Frank A. Hansen, L. A. Politowski, G. G. Vanhorne, Fred Hagerman, Walter Hertzog, E. G. Alberts, W. W. Pearce, L. E. Mozelle, A. C. Hall, A. J. Hartman, Charles W. Preston, and W. D. Hostetler. The sub-

jects covered included refrigeration, ranges, gas versus electricity, water heaters, wiring, home lighting, commercial lighting, kitchen planning, electric heating, air conditioning, commercial cooking, as well as sales methods, financing plans, small appliances and laundry equipment.

The students spent the morning at the City College and the sales training rooms of the League in preparing for and discussing their work in the business firms in which they received practical training. These students spent afternoons and Saturdays working for these firms.

Friday, March 24, on reaching the fourth week of training, "Practice Cooking on the Electric Range," as a sort of testimonial dinner, and also to assist in placement, Mr. Adams of the Electrical Development League of Southern California—the instructor certified to teach this group, invited a group of those interested in the work of the group to a luncheon. The food had been prepared by the class and everyone present in the group who had not been before was thoroughly sold on electric cookery.

To date all seven of these students have been placed.

Next year we hope to have developed material so that at least eighteen or twenty will receive their sales training on this cooperative basis each semester. The suggested outline of subjects to be included in the curriculum for Electrical Equipment Merchandising this fall is as follows:

A. Fundamental knowledge of direct and alternating current: 1. voltage, 2. amperage, 3. wattage, 4. Ohm's law, 5. power formula.

B. Motors: 1. Universal motors as used in vacuum cleaners, etc., 2. fractional horsepower motors as used in domestic refrigerators, etc.

C. Heating elements for: 1. range, 2. water heaters, 3. space heaters.

D. Automatic control devices.

E. Knowledge of minor electrical repairing.

F. Fundamentals of construction of ordinary domestic electric meters, how to read them and how to calculate bills.

G. Fundamental knowledge of connecting and operation of major electrical appliances: 1. electric range, 2. electric water heater, 3. refrigerator, 4. washing machine, 5. ironing machine, 6. waste disposal unit, 7. dish washer, 8. vacuum cleaner.

H. House wiring: 1. elementary knowledge of local code requirements, 2. wire size and load carrying capacities, 3. switches, fuses, etc., 4. reading, wire plans and symbols.

I. Kitchen planning.

J. Illumination: 1. different types of illumination and advantages of each, 2. use of light meters, 3. proper placement of fixtures.

K. Electric heating: 1. different types of electric heaters, 2. proper placement and proper sizing of heaters, 3. insulation.

L. Air conditioning (very brief).

Pet Peeve Contest

Spokane range contest springs a new wrinkle

Dealers in the Inland Empire are promoting a novel electric cookery observation quiz contest to stimulate public interest in electric cooking. Such captions in advertising the quiz questions as "Do You Look without Seeing?" and "Just How Smart Are You?" challenge every housewife on the observation of small matters of everyday cooking. The housewife is also given a chance to express herself on matters of irritation about here kitchen in writing a paragraph on "My Pet Kitchen Peeve."

Build-up for the contest was created by extensive advertising over the radio and in newspapers, first using teaser ads, and challenging statements to arouse interest, then more generally stressing the advantages of electric cooking and inducing the reader to contact dealers for more specific information about the quiz questions.

Each week a first prize of an electric range and six minor prizes of small electrical appliances are given to the best group of answers and pet peeve description. The ranges were contributed by nine range dealers, the other prizes by the utility. As a special inducement to turn in blanks, made available in newspapers and through dealers, the utility presents each entrant with a recipe cover, celebrating its Golden Jubilee anniversary.

The questions in the contest were such that they bring the prospective customer to the dealer for answers and for the dealer's signature on the official entry blank. This and the pet peeve paragraph give the dealer an opportunity to determine the needs of the prospect, give him an insight into what would most interest the housewife, and create an opening for his prospective sales presentation. This contest started June 5, and will run for nine weeks.

Radio Shows

Dealers and utility put them on for the public

Showmanship has been the central theme of Pacific Power & Light Co.'s promotion of radio sales in its territory during the past four years. This has taken the form of radio exhibits and shows presented in all the leading communities in the company's territory during the fall season.

Though PPL no longer merchandises radios, it provides the exhibition hall, furnishes the entertainment and gives the show substantial advertising. Dealers in these communities tie in by furnishing new model radio sets for exhibits, decorating booths and assisting in the advertising of the show as a community event. For instance, radio dealers in The Dalles, Ore., staged a parade which led to the outskirts of the city where a bonfire was started with obsolete radio sets. This preceded the show to be held that evening.

In the different communities a total of 105 dealers cooperated with the company, exhibiting 23 makes of radios. The company's exhibit at each of the shows was confined to methods of eliminating radio interference and presenting pictures of its physical properties in the communities served.

Window Winners

Refrigerator contest in northern California in three divisions

The Electric Appliance Society of Northern California has announced the winners in the window display contest held in conjunction with its annual refrigerator campaign, which closed in May.

In District 1, San Francisco, Oakland and Berkeley, 1st prize went to Herbert Dasteel, Nathan-Dohrmann Co., San Francisco; 2nd prize, Charles H. Bishop, Rodlick-Newman Co., San Francisco. District 2, Sacramento, Stockton and San Jose; 1st prize, Joseph J. Ralph, Breuner's, Sacramento; 2nd prize, Lowell F. Sheldon, Sears Roebuck Co., Sacramento. District 3, all other cities in the campaign territory, 1st prize to C. Harlie Power, C. Harlie Power Co., Livermore; 2nd prize, Claxton White, Claxton White Co., Pittsburg.

Honorable mention went to Lynn S. Taylor, Jackson's, Oakland; J. B. Bouckhout, L. Lion & Sons, San Jose; R. E. Warmack, Warmack Electric Store, Oroville; Herschel Jones, Holman's Department Store, Pacific Grove; P. Wade, Chris Wade, San Leandro; and T. Treanor, Earl Grady Home Appliance Co., San Rafael.

A REFRIGERATION discussion forum was held by the refrigerator dealers of San Diego to discuss some of the merchandising problems and practices of refrigeration sales. The 1st meeting was held May 25, at the U. S. Grant Hotel. On June 28, F. H. Harrigan, field representative MKB, addressed the group at a "Trade Selling Practice" meeting.

Safety and Sales

Joint meetings of P. G. & E. employees throughout system

Safety and sales were combined in a series of 12 meetings held recently in the 12 divisions of the Pacific Gas and Electric Co. Continuing an annual custom of calling all employees together in a series of meetings, this year both the operating and the sales department combined in the program. The operating department discussed safety with a hot line tool demonstration for the electrical safety program and a demonstration of tapping of high pressure gas lines for service extensions for the gas division.

Sales prospects for the year were presented by O. R. Doerr, chairman of the sales committee for R. E. Fisher, vice-president. Announcing a grand sweepstakes program, all employees were furnished prospect tickets which can be turned in on a grand drawing to be held in San Francisco previous to the P. G. and E. day, October 21, at the Golden Gate International Exposition. Winner of the sweepstakes will be provided a free trip, for two people, to Honolulu with all expenses paid. Local prizes for prospect tips will provide trips to the Fair.

Meetings were held in the division headquarters of the 12 divisions with a total attendance of over 10,000 employees. The sales part of the program was presented in a skit in which Bill Parks, Harry Carroll, F. N. Naylor and Bert Reynolds participated. Special emphasis to the domestic field was given in this clever presentation.

Sales Tax Ruling

California board changes contractor tax method

Sales tax as applied to electrical contracting will be handled under a new interpretation of the Board of Equalization, State of California, beginning July 1. Electrical contractors, plumbers, and heating and air-conditioning contractors have been under a special ruling, classifying them as retailers. The new ruling brings them under the contractor classification and in general they pay the tax for their materials at the buying source.

This tax applies on the cost of materials whether the contract be lump sum, cost plus, or time and materials. It is paid to the state by the contractor or the material dealer, depending on whether the contractor continues under a retail certificate as a dealer. Fixtures are considered as a retail sales item, as are over-the-counter sales and jobbing sales. In a contract job, however, tax on fixtures can be paid for at the cost to the contractor and he may pay direct to the manufacturer or wholesaler of such fixtures as he does with construction materials.

A contractor who has a merchandising store may have a retail permit but on construction work can pay the state on the cost of the materials rather than the selling price as formerly. When he makes retail sales of materials which he has purchased tax-paid from a wholesaler, he must report to the board the retail selling price of the sale but can deduct the cost of the materials plus tax and pay additional tax merely on the markup. On tools and supplies, such as oxygen, acetylene, thread cutting oil, etc., he is classed as a consumer and must pay for such items at the time of purchase.

This new ruling will relieve most contractors of onerous accounting and a confusion of interpretations which have plagued them in the past. The state also hopes to collect more tax through the wholesalers than it has been able to do in following up such vast numbers of casual, or curbstone contractors.

Water Systems

Puget Sound dealers launch this year's drive

Electric water systems emerged from winter hibernation for the year's strong campaigns in Pugent Sound Power & Light Co. territory from May 15 to June 15. With the experience of past campaigns backing them, electric pump dealers, jobbers and distributors and the power company began work on the campaign in February. During April three meetings were held, one at Olympia, another at Mount Vernon, and a third at Ellensburg for the pump dealers in the southern, northern and eastern divisions of the company.

"Every Sale—First a Prospect" was the theme that had been given the campaign by R. W. Clark, merchandise manager, to emphasize the fact that the number of sales depended upon the volume of prospects obtained and sold.

At each meeting, a local dealer acted as chairman and speakers from the distributors and the utility covered subjects as follows: Power Company, Distributor and Dealer Relations; Operating Rate for Pumps; Practical Running Water Applications; Where Systems Can Be Sold; Prospects and What They Mean to Dealer Sales; Financing of Running Water Installations. Announcement of prize winning window contest for dealers, and the showing of an irrigation running water film, also were made part of the meeting.

AN 80-PAGE SUPPLEMENT of *The Portland Oregonian* in late May featured the Northwest Home Show in fine style. The section was designed as a 42,000 word book to carry the interested home-builder through the major phases of home building and home renovation. Finance, location, type of house, designing, construction, heating and plumbing, furnishings and fixtures, landscaping and renovating were completely covered. A check list was also furnished, offering additional sources of information on home building, and where plan services might be obtained.

ONE OF THE most potent means of making Portland restaurants electrically minded has been the publication "Reddy Kilowatt's Restaurant Review," published by the Portland General Electric Co. and distributed monthly by that company to all restaurant customers and prospects. The little 4-page paper is edited by Daniel Brown, commercial cooking representative, under A. H. Greisser, manager of Light & Power Sales Bureau, of the Portland G. E. Co. It is illustrated profusely with all recent installations of electric cooking equipment in local restaurants. The pubilcity given a restaurant by this means is considered in itself a strong selling point by many. The "Review" is loaded with good selling points as to the benefits of electric cooking equipment.

KENNETH F. DELATE, Idaho Power Co. salesman, Pocatello, has been named winner of one of the five R. B. Marshall awards for electric ranges sales in 1938. The prize, a check for $100, signifies the best sales performance in connection with electric ranges for utility companies having between 25,000 and 50,000 domestic customers. DeLate sold 157 ranges during the year in a territory of 1,100 customers. He was also first in refrigerator sales for 1938 and second in water heater sales.

WESTINGHOUSE LAMP CO. "Caravan of Light" began a tour of the Rocky Mountain region at Denver, May 17, and continued to visit other Rocky Mountain cities with its motorized demonstration display of late developments in lamps and lighting. D. A. Steinkamp was in charge of the caravan. Tie-in was made with the Junior Chamber of Commerce's "Safety With Light" campaign for a number of public meetings.

Wire Rope

Electricity provides controlled heat for lubricant

By F. J. MAHR*
Pacific Gas and Electric Co.
San Francisco

Tar is not generally thought of as a lubricant. Yet, as such, it is one of the most important materials in the wire-rope industry.

Steel wire ropes are composed of strands of wire. When such a cable is put in service, each wire is forced against its neighbors. In order to improve the cable's wearing qualities, therefore, lubrication is necessary.

Fully as important is the function that tar performs in protecting against corrosion, dirt, water and the elements. Wire ropes used in the mining, dredging and oil industries must be treated with tar; otherwise they will rust from within because of moisture finding its way between the strands. Some ropes, made with a Manila rope core, must also be treated in order to preserve them and to lessen the wear on them during the fabrication process.

The tar used in the wire-rope industry is a compound with a petroleum base. A by-product of oil refineries, it is supplied in a semi-solid state in 50-gal. drums. It is stickier and considerably softer than roofing tar, and is compounded especially for the trade.

Investigation of the tar-compound problem revealed that the Edwards Wire Rope Co. was having difficulty in supplying to the stranding machines a sufficient quantity of the material in a properly molten state. The old process consisted merely of heating the compound without regard to precise temperature, although it was vaguely known that a temperature of 270 deg. F. was somewhere near right. Under such conditions it was difficult to regulate the heating equipment and obtain maximum results from its use.

A further check indicated that an insufficient amount of compound was only a part of the difficulty. With some employees it was a case of "just another barrel of tar," the handling of which was an unskilled task requiring little science or attention. Consequently the old method of heating the compound in small round pots, with open flames underneath, seemed logical because it had always been done that way. The finished strands as they came together from the stranding machine were simply passed under a spout through which the compound flowed from the pot. An attempt to control its flow by a small valve was impractical. The compound came either too fast or too slow; or the spout was in the wrong position and the compound was spilled.

Rectangular tank with dipping sheave

Delving further into the puzzle, the utility representative found that the following factors prevented smooth and continuous operation: (1) When too much heat was applied to the pot, the compound became too thin and flowed too fast and not enough adhered to the strands. (2) When insufficient heat was applied, the compound thickened and too much adhered to the strands. (3) Proper penetration of the compound between the wires of the strand was assured only when the correct temperature was reached by chance.

(4) Excessive temperature caused the compound to vaporize or smoke. (5) The workmen, in endeavoring to operate the machines at highest possible speeds, would occasionally apply more heat than was consistent with safety. (6) Fire hazard was always present, especially when production was speeded up. (7) The necessity for watching the compound pots diverted the attention of the operators from the essential concentration required in manipulating the stranding machines themselves.

The problem thus analyzed, it became apparent that something more than just heat was required. In order to obtain uniform penetration and adherence of the compound and in order to eliminate hazards, automatically controlled, safe and fool-proof heat was needed. Only electric heat could fill the need.

It was apparent, too, that with electric heating units available in many shapes and capacities, wide latitude was permitted in designing new equipment for heating the compound and dipping the strands.

As a step toward the adoption of electric heat, Edwards Wire Rope Co. had constructed a large, welded, rectangular tank of such capacity that one filling per day was ample. Mounted on the top is a dipping sheave. This consists of a grooved wheel that revolves within the tank, and the strand, passing around it, is immersed in the compound.

This method of handling the strands had proved far superior to the old. It needed only the correct application of heat to make it highly efficient, safe, automatic and economical.

In estimating the heat requirements, it was necessary to take into consideration the fact that the compound is difficult to handle when cold and in a semi-solid state, and is heated to a temperature of 150 deg. F. before being put into the tank. In the tank its temperature is raised to 270 deg. for the strand-immersion process. Therefore, the heat demands are basically threefold:

(1) Heat taken up by radiation—8,250 B.t.u. required; (2) heat required to raise the compound from its charging temperature to that of application—180 B.t.u.; (3) heat absorbed by the strand itself—8,000 B.t.u. Total B.t.u. 16,430.

This meant, since 3,415 B.t.u. equal one kw.-hr., that approximately 5 kw. would supply the ample heat input.

The screw-in type of G-E Calrod immersion heater was selected because it permitted a comparatively simply installation. Two threaded collar flanges were welded on the outside of the tank into which the units were screwed. One was placed on each side of the dipping sheave in order to give even heat distribution. By dividing the heat input into two units of 2.5 kw. each, a much lower watt density of exposed surface of heater was obtained. This spreads the heat liberated from the immersion unit over a surface sufficiently large to prevent carbonization and possible damage to the compound or the heater.

Automatic control was supplied by a standard control instrument designed for use with small electric heating units. While this thermostat could ordinarily carry the load, controlling the load through a magnetic switch added a measure of strength and ruggedness—an important factor because of the vibration in a wire-rope plant. The additional cost of the magnetic switch was warranted because it not only minimized wear and tear on the thermostat, but it also made the operation of the pot doubly fool-proof.

More than twelve months have elapsed since the first electrically heated tank was installed, and it has operated so successfully that five more have been built.

* This article is a condensation of Mr. Mahr's prize-winning seventh place submission to General Electric's industrial heating contest.

HOTPOINT launched in May and June an intensive summer campaign for electric ranges with three big features, national magazine advertising, newspaper tie-up and a complete sales promotion program. The magazine medium was destined to carry the Hotpoint "Be Thrifty-Be Modern" message to nearly every other wired home in communities throughout the U. S.

"HOW HOT IS HOT?" is a catchy title of a novel and provocative quiz game promotion piece prepared by the Westinghouse Appliance Dept. for the stimulation of public interest in electric water heating and dish washers. With a thermometer which can be submerged in water, the promotion piece contains a number of sheets of questions which bring out the advantages of having controlled temperature hot water for all kinds of home usages. The back page contains some drawings illustrating the comparative disadvantages and advantages of having inadequate hot water service as against adequate and controlled hot water service through electric water heaters.

HANDSOME 1939-STYLED electric refrigerators will remain on parade until July 15 in Northwestern Electric Co.'s annual All-Dealer Show. Eighty boxes and 17 different makes are assembled for public inspection on the display floor, which has been turned into an ice grotto. A "Scotch Eskimo" is being used by the company as a symbol of electric cold in an intensive advertising campaign tying in with the show. J. W. Bremmer is in charge of the exhibit.

Future Campaigns

Western utilities swing into active summer sales promotion

Campaigns on all types of appliances are humming in the 11 Western states. Here are the activities of various utilities:

British Columbia Electric Railway Co., Ltd.—August, company displays at Vancouver annual exhibition, Aug. 28-Sept. 4.

Coast Counties Gas & Electric Co.—July, roaster and range campaigns, and August, roasters and ranges.

Los Angeles Bureau of Power & Light—July, and August, water heating campaigns.

Montana Power Co.—"Summer Cookery" campaign running June 19-August 19. Divided into three periods, June 19-July 8; July 10-July 29; and July 31-August 19, this campaign offers winning salesman a grand prize of a first-class round-trip railroad ticket to both World's Fairs, or the equivalent in cash, $135. Campaign will be backed with publicity program, outdoor displays, window and store display, handout pieces and bill inserts.

Nevada-California Electric Corp.—July and August, range campaigns. Salesman qualifying gets two round trip tickets and all expenses for two people to San Francisco Fair.

Pacific Power & Light Co.—July, refrigerator campaign, and August, all-electric kitchen feature. Special event, electric cookery.

Puget Sound Power & Light Co.—July and August, range, water heater and refrigerator campaigns.

San Diego County Bureau of Electrical Appliances—July and August, refrigeration campaigns.

Southern California Edison Co.—July and August, range and water heater campaigns.

Southern Colorado Power Co.—July and August, range, refrigerator and water heater campaigns.

Utah Power & Light Co.—July and August, range, water heater, hotplate and roaster campaigns. In July, special camp to show divisions.

Valley Electrical Supply Co., — Fresno, Calif.—June, roaster, ranges and water-heater campaigns; July, roaster campaign.

APPLIANCE SALES REPORT, 1939

A Summary of Dealer and Utility Reports Compiled by Associations, Societies, Bureaus, or Dealer Contact Departments of Utilities

REPORTING COMPANIES	Idaho Power Co.[1]		Northwestern Elec. Co.[2]		Montana Power Co.[3]		P. G. & E. Co.[4]		San Diego Cons. G. & E. Corp.[5]		San Joaquin Power[6]		Southern Calif. Edison Co., Ltd.[7]		Utah Power & Lt. Co.[8]		Wash. Water Power Co.	
	Current	5 Mos.	Current	†Mo.	Current	4 Mos.	Current	4 Mos.	Current	5 Mos.	Current	5 Mos.	Current	4 Mos.	Current	4 Mos.	Current	5 Mos.
Ranges	411	1,466			166	196	305	1,136	54	183	157	605	199	692	339	980	220	830
Water Heaters	232	658			29	40	248	915	43	142	72	314	70	254	138	250	184	516
Air Heaters, aux.							131	1,900			4	116	71	687	19	296	22	347
Air Heaters, 220							87	366			23	238						
Refrigerators	801	2,069			1,307	1,821	5,351	13,732	771	2,745	625	2,551	4,013	10,014	899	2,271	1,370	3,523
Dishwashers	3	7					12	46							8	13		
Washers	469	2,093			1,001	1,901	2,729	10,097	329	1,690	310	1,418	2 354	8,237	693	2,554	524	2,146
Ironers	27	186			108	208	479	1,757	40	236	42	196	261	996	41	201	21	138
Vacuum Cleaners	119	707			487	841	2,689	10,788	207	1,187	133	485	1,346	4,831	319	1,449	223	1,152
Radios	511	3,252			2,038	4,702	7,069	35,127	828	4,231	446	2,649	4,466	16,968	946	6,667	1,360	6,483
Mixers	57	289					209	1,070	131	397	32	196	213	1,006	108	580	129	579
Cookers, Casseroles	44	115							54	222	32	145	18	115	12	52	315	982
Irons	535	2,180							425	1,810	274	1,172	975	4,041	705	3,271	634	2,777
Waffle Irons	167	566							228	727	69	394	297	1,329	260	1,439	184	737
Toasters	193	991							406	1,425	117	601	477	1,895	247	1,410	372	1,727
Table Stoves	314	905			1,529	3,250			52	299	20	120	180	789	248	673		
Heating Pads	47	411							71	659	23	213	111	861	189	780	52	447
Curling Irons													38	177	172	467		
Coffee Makers	242	973							373	1,421	109	639	255	977	106	629	369	1,762
Sewing Machines							388	1,795	104	527	4	50			149	639	69	384
Clocks	127	638							305	1,438	116	668	477	1,885	356	1,250	183	1,010
Fans	67	116									92	143	103	149	18	48	175	290
Floor Polishers																		
Sun Lamps	17	121											54	912	9	37	15	66
Reflector Lamps	295	1,763									221	859			653	2,980	585	5,114
Misc. Lamps	592	2,685			1,795	2,662											651	3,757
Misc. Small Appl.									530	1,765	115	466	803	2,255				
Shavers													1,202	912				
Yard Lights											134	234			14	146		

SOURCES

[1] Figures compiled by Electric Equipment Sales Association. Include power company sales of all reporting dealers.

[2] Lists appliances sold by dealers in Portland area. Figures compiled by Northwestern Electric Company.

[3] Combined dealer and company sales from report of Montana Power Co.

[4] P. G. & E. reports sales of major appliances only based on accurate reports from dealers' accounts. Ranges, water heaters and air heaters include company and dealer sales. * Due to delays in compiling report current and total figures are always one month behind those figures of companies reported in other columns of this table.

[5] Gathered by Bureau of Radio and Electric Appliances of San Diego County. Estimated monthly sales figures used in this table: Miscellaneous figures includes fans, curling irons and sun lamps.

[6] Compiled from dealer reports by Merchandising Division of San Joaquin Power.

[7] Includes reports from dealers on San Joaquin Valley system of company as well as Southern California areas served.

[8] Includes Utah Power & Light Company territory in Utah, Idaho and Wyoming. Also Western Colorado Power Company territory.

† May figures were not available at time of going to press.

(8)

Electrical West

Sales Guide

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No. 7-c JULY, 1939

It has everything—

Including the Kitchen Sink

The age of Kitchens is with us. Ten years ago it was fancy bathrooms, but today Kitchens take the eye. With this kind of public interest, it is smart merchandising to make this interest in kitchens sell electric appliances for you. Women's magazines are full of kitchen modernizing ideas and pictures. Your move is to make them come to life in your prospects' homes, to your own profit.

Sale of an electric kitchen offers you a chance to sell several appliances in one order. Usually it is easy to sell better grade, higher priced appliances when they go to make up a complete kitchen. Financed under one long term contract, (F.H.A. or the Acceptance company connected with the manufacturer you represent) the prospect is willing to pay more and get the best.

The complete kitchen has a number of appeals of its own that you can use. (See inside pages.) These apply to the entire kitchen. Then you have the appeals for the **electric range** (Sales Guide for Feb. 1939), the **electric refrigerator** (Sales Guide for April 1939), the **water heater** (Sales Guide for March 1939) and the **mixer** (Sales Guide for June 1939).

Electric dishwashers and sinks are coming into their own. In fact they are right on the edge of a boom. It is definitely time to start selling them. Because they need accurately controlled hot water they help you sell the water heater too. The advantages to ownership (listed inside) are best dramatized by leaving a demonstrator model with the prospect for a few days to let her try it in her own way with her own dishes. There is no trade-in problem in selling them; no price wars or cheap competition. To the woman who already has everything else electrical in her home, the dishwasher-sink and disposal unit make you another opportunity to sell.

What Electric Kitchens mean to You

What to Say

Use these in your presentation

Kitchen Talking

to make any woman's heart yearn for a

About the Kitchen Itself—

A new social center for the home, just as the kitchen used to be in pioneer days.

Attractive enough to invite everyone to enter and admire.

Planned to save footsteps and standing, with centers for storage of foods, preparation of meals, cooking and serving, conveniently arranged to conserve time and physical effort.

More gracious entertaining with equipment that takes the work out of preparation and produces tastier results. Reputation as a hostess can be achieved easily.

Promotes family pride and creates a desire to spend more time at home among the children and their friends.

Attractive and cheerful place to spend time and to work, eat or entertain informally.

Fresher air, and better health, for cooking odors and fumes are eliminated or drawn away. Better tasting and healthier cooking with electric vitamin-saving, mineral juice preserving methods.

Less cleaning up needed, less upkeep, less painting and redecorating.

Servants seldom needed in a kitchen that helps to prepare the meals and wash the dishes after them.

Enhances the value of the home in case the property has to be sold.

Stays modern longer than with other equipment. It is tomorrow's kitchen today.

More time with the family or guests, for an electric kitchen is time releasing, does so many things automatically.

About the Range, Refrigerator, Water heater, Mixer, and Adequate Wiring—

(See Sales Guides for January, February, March, April and June for lists of the advantages and benefits by each of the foregoing. These are also attributes of an all-electric kitchen.)

About the Dishwasher—

Germ breeding dishrag is eliminated. So is the dish towel and its laundering.

Carrying of colds and infections is prevented because dishes are washed and rinsed in water hotter than hands can stand, and thus sterilized.

Easier on the dishes, and saves breakage of expensive or treasured china.

Less time required in the kitchen, more permitted with the family. No arguing with children over doing of dishes, nor breakage when they do. No piles of dishes on return from a trip. When ill or occupied or on vacation the children or husband can do up the dishes quickly and painlessly.

(It has been estimated that 39 per cent of the husbands help with the dishes and hate it.)

Standing on tired feet eliminated. Cooking takes about 19 per cent of a woman's time, washing dishes by hand another 13 per cent—all spent on the feet.

Pots and pans wash easily where foods are cooked under controlled clean electric heat. Dishwasher will wash any pan that does not require scraping anyhow. Utensils used to cook the meal can be washed while the meal is eaten.

Fancy and elaborate meals no longer dreaded because of the aftermath of dishwashing. Meals taste better to the woman who does not have to look forward to a stack of dirty dishes.

Users swear they would give up any other appliance rather than the dishwasher. Proved its practicability by over 10 years operation.

Less need for kitchen help.

•

About the Garbage Disposal Unit—

The most disagreeable problem solved. It disposes of food wastes as fast as they are made and before they stand and putrify.

No garbage can can be kept sanitary, but this unit can. There is no place for germs or molds to collect or grow. It is cleaned automatically by flushing with water from the tap.

No separation or wrapping of garbage needed. Only cans and bottles remain to be disposed of with other dry rubbish. Less costly or frequent service needed.

STAMP OF APPROVAL

Recommended by Your

THE MONTANA POWER CO. • UTAH POWER & LIGHT CO.
IDAHO POWER CO. • CALIFORNIA OREGON POWER CO.

Points

matchless modern electric kitchen

Takes care of bones, fruit pits, corn cobs, peelings, rinds, roots and leaves. Waste material ground to a thin pulp and washed into the sewer.

Sweet smelling kitchen and porch always. Melons and canteloupes or onions do not remain to generate odors while awaiting garbage collection.

In cold weather there is no need to go out in the cold to dispose of greasy garbage.

Stray cats and dogs cannot overturn garbage can and spread refuse.

Ants, flies, roaches or other vermin are discouraged. There is nothing to attract them.

There's pride in being in advance of the times with the very latest of kitchen services.

•

About Kitchen Ventilation—

A clean smelling kitchen and house because food odors, steam and smoke are withdrawn immediately. A house free from kitchen odors of cooked foods such as cabbage, etc., which remain in the drapes and rugs of the house for long periods.

Cleaner curtains and walls, for the grease-laden fumes are drawn straight out and not allowed to deposit on the walls or drapes.

Fresh air in the house, without insects. Fresh air is drawn in by forcing stale air out. As new air seeps in flies and insects are unable to enter.

Maintains vitality because of the change of air and coolness of the kitchen.

•

About Kitchen Lighting—

The center kitchen fixture dresses up the room and provides general lighting. It can be had in a variety of finishes to match the trim.

No standing in your own light, since the light is diffused throughout the room. No bright surfaces reflect glare into the eyes when light is diffused.

Over the sink, light is needed to make selection of vegetables and fruits easier while preparing meals. Spotted, soiled or spoiled articles can be seen more easily. Dishes can be washed cleaner, etc.

Under the cupboards, as with a desk lamp, more light

is concentrated on the details of the work and speeds up the seeing.

•

About a Kitchen Radio

It's good company while working away in the kitchen. No need to miss favorite programs or news even though the big radio is in the living room.

Home-making programs, with cooking hints and recipes can be heard where they can be used, or notes written for the cookbook.

Provides music for those informal snack parties in the kitchen.

•

Kitchen planning — Check with the power company and find out what is available to you in the way of help in kitchen planning. Make full use of such service. It all helps make satisfied customers, both for you and for the utility. It's good business.

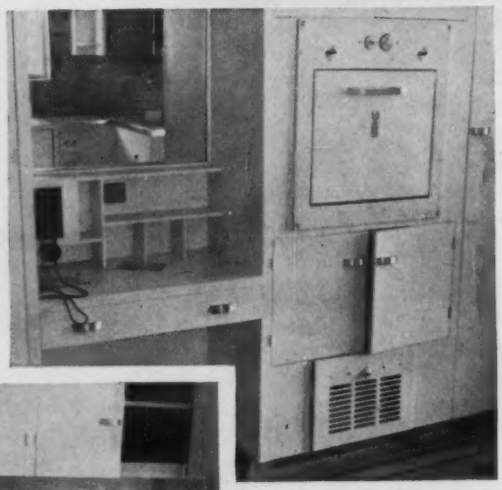
to close the Big orders Sell Electric Kitchens

Sales Allies —
PUGET SOUND POWER & LIGHT CO.
PORTLAND GENERAL ELECTRIC CO.
WASHINGTON WATER POWER CO. •

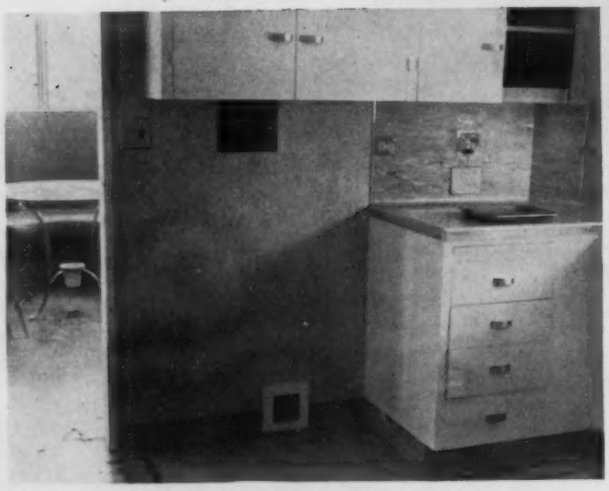
What to do—

Sell Kitchen Ideas

The way women like to see new homes on display tells how interested they are in new ideas in kitchen arrangement that mean less housekeeping. Here are a handful of brand new kitchen ideas from the Matchless Electric Home of the Electrical Development League of Southern California, in which the very latest ideas and devices of the industry were pooled and demonstrated.

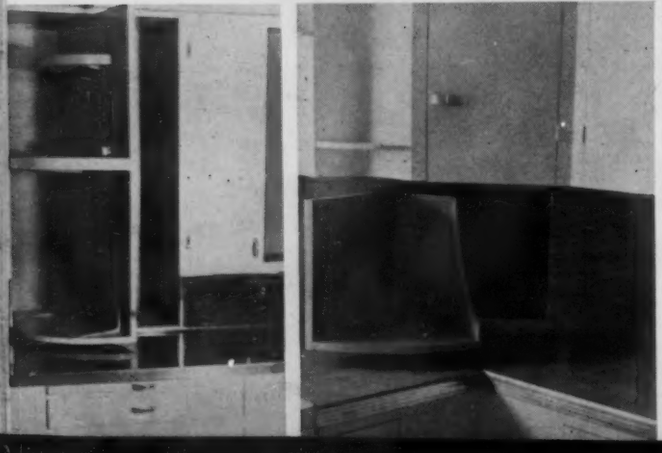


Space for electric range, with flush range outlet near floor and electric ventilator under cupboards; appliance outlets and a retractable cord in the wall back of the work space. A concealed lumiline under the upper cabinet provides ample work light. In breakfast nook, seen at left, a floor outlet serves the breakfast table appliances.



In the upper corner is a novel breakfast nook idea with a circular bench and three-cornered table equipped with appliance outlets on one leg. Below, separate warming oven and electric heater built into the wall next to the planning desk. Oven temperature (150 to 500 deg.) and heater are both on time control.

To get usable space from otherwise dead corners in a U-shaped kitchen revolving shelves like those shown at left solve the problem. A pie-shaped right-angle bite is taken from the rotating shelves to accommodate the outside facing. When turned in place these conceal the revolving shelves in a corner that matches the rest of the trim. The picture shows the right hand one only partly turned.



At left, two ideas for stowing away the mixer yet having it always handy and ready to operate. At left a complete wall panel turns. At right the hinged shelf hides under a corner cupboard.

—and How

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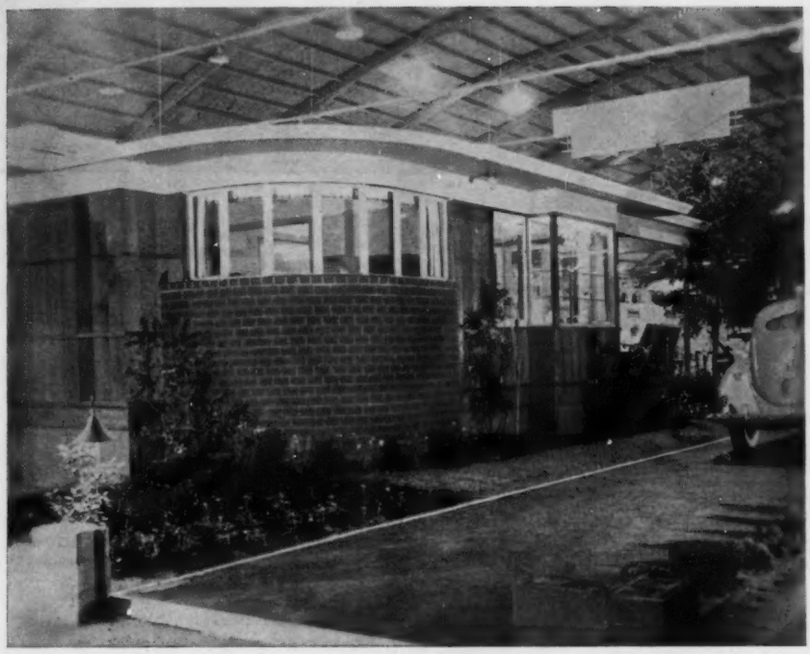

Matchless Electric Home

HIT of the Southern California Home Show at Pan Pacific Auditorium, Los Angeles, was the Matchless Electric Home of the Electrical Development League. Of the 100,000 paid admissions, 47,932 people stood their turn in line and went through this home. Many others protested to the show management when crowds prevented their seeing it. Planned to admit ten people at a time, give a lecture with each room, this had to be abandoned because of the home's popularity. Moved intact to 3956 Wilshire Blvd., with a lighted badminton court, home garage workshop and electric range exhibit added, it will be on public display all year.

Designers of the home, Art Elliott and Louis Politowski of the Bureau of Power & Light, strove to make it not only the usual all-electric, but also the unusual. These unusual ideas and devices were spice that brought forth the full all-electric flavor. Some of these are illustrated here. Top of the page, the exterior, with light under the eaves, also garden lighting that matches the garden. (1) How the crowds stood in line to get in. (2) At the exit a display card told what adequate service means, and backed it up by lists of appliances used in 1915, 1920, 1930, and 1939. An information booth offered kitchen planning and home wiring plans and certification. (3) Illuminated shelves for glasses. A light box, back of the opal glass back, open at the bottom to illuminate the counter below. (4) Light built into the ceiling over the full length mirrors in the day's bedroom. Even an automatic switch (from a refrigerator) was developed for sliding doors of clothes closets like these. (5) Besides lumiline lights at mirrors, outlets, a full length air heater, controlled on a 3-way from the bedroom, the bathroom contained a new idea—400 watts of soil heating cable imbedded in the tile floor to warm it. (6) Fixture association members designed special lighting fixtures for the home. Here is a design (bottom left) by Wagner & Woodruff for a dining room—totally indirect with a "spotlight" of tubular glass in the bottom to project light down on the table, its silver, china, food and flowers. (7) Load center panel, flush mounted, with 225 amp. capacity, all multi-breaker controlled. (A Group 3 service according to the plan outlined by C. A. Rowley, Electrical West, Jan. 1939, p. 42.) In contrast to this neat panel, pictures showing old assemblies of externally operated switches were placed alongside. (8) Popular glass window shelves for plants or colored glassware, lighted from a flush panel above. Attractive folders were distributed listing electrical ideas and names of suppliers, contractors and architects.

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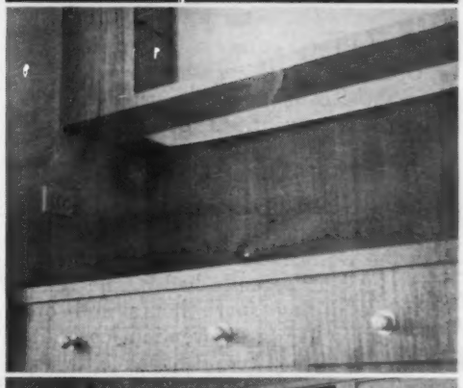

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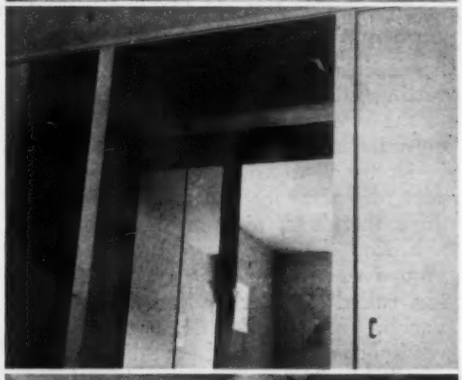

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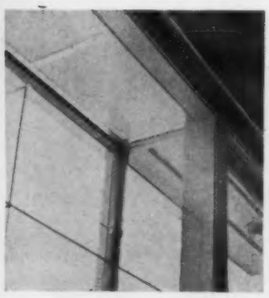

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The A. I. E. E. Comes West

THE lobby of the Fairmont Hotel, atop San Francisco's Nob Hill, was abuz the last Monday morning in June. There was standing room only, for a great crowd of men and women, from all corners of the country, was assembling there. New guests kept arriving in a stream. Greetings were hearty. Many had not met for years. On hand were plenty of big wigs, and among the lesser lights was many an electrical engineer whose name will appear on the industry's honor roll tomorrow. The West was playing host to the AIEE.

Occasion for this gathering was the Institute's combined summer and Pacific Coast convention. But no one had expected such a turnout—937, ninety more than the average attendance for the past 10 years.

Reason for meeting in San Francsico was the Golden Gate International Exposition, which guests had ample time to visit, during spare hours and on Tuesday, when a convention cocktail party filled the Yerba Buena club to overflowing.

But this and other parties, golf and tennis, inspection trips, were simply diverting fill-ins between periods devoted to the one reason for the convention: outlining and discussing a year's growth in electrical knowledge. For this purpose, delegates met in three groups on three mornings, nine meetings in all.

Paving the way for work of these groups was the opening general meeting, called to order by S. J. Lisberger, Pacific Gas and Electric, general convention chairman, to whose diligent care may be attributed a great portion of the convention's success. Institute President John C. Parker, vice-president of Consolidated Edison, outlined an ideal organizational set-up toward which the Institute is striving, urged each individual engineer to look beyond the mere task of perfecting the electrical art and to see as clearly as he can the goal toward which our civilization is moving.

Then came the honoring of members who have made exceptional contributions to the electrical field. The Institute's number one award is the Lamme medal. This was presented by P. M. Downing, vice-president and general manager of P. G. and E., to M. A. Savage, General Electric designing engineer. Downing said in part:

"Savage's work has not only improved the efficiency of high-speed turbo alternators (for his work on which the award was made), but also has served to reduce the cost of power and thereby deter the construction of uneconomical, subsidized hydro plants. During the past 16 years, he has supervised the design of 398 turbo-alternators, aggregating 13,000,000 kva. in capacity, while at the same time he has solved many electrical, mechanical and metallurgical problems. And much of this was done despite serious illness."

Prize Papers

Last year's papers, subsequently judged, received awards as follows:

Best engineering paper: "Unsymmetrical Short Circuits on Water Wheel Generators Under Capacitive Loading," by C. F. Wagner, Westinghouse consulting transmission engineer.

Best paper on theory and research:: "Mechanical Uniformity for Paper-Insulated Cables," D. L. Smart and J. M. Reynor, Detroit Edison, and K. S. Wyatt, Enfield Cable Works Ltd., England, formerly with Detroit Edison.

Best paper on public relations and education: "Economic Status of the Engineer," R. W. Sorensen, California Institute of Technology.

Best initial paper: "Current Carrying Capacity of Rubber Insulated Cable," by S. J. Rosch, Anaconda Wire & Cable Co.

Best student paper: "Methods of Determining the Efficiency of Small Motors" by John L. C. Locke, University of Denver.

Principal other general meeting was to hear Dr. Adam S. Bennion, Utah P&L, speak on human relations. These must improve, and quickly, he warned, or there may be no call for engineering progress. His remedy: much closer association of management and labor and customers.

Mingled Steam-Hydro

Naturally enough, a great deal of technical progress, important and excellent as it may be, is really intelligible to only an initiated few. But if general interest, together with broadness of subject and viewpoint and thoroughness of approach were set up as criteria of a good paper, that of A. H. Markwart, vice-president in charge of engineering, P. G. and E., of those presented at the convention, would rate number one. His subject: "Mingled Hydro and Steam Power Production in California —Past, Present and Future."

More than a mere outline of California's potential capacity, Markwart's paper lays an historical background, analyzes power development, and points toward fundamental principles which must govern the most economical use of power resources, no matter by whom they are being worked.

He characterized power development as having passed through two stages and into a third: (1) pioneering, (2) expansion, (3) federal multi-purpose projects. The following extract indicates his viewpoint on economic operation in the third phase:

"It is useless at this stage to discuss the merits and justification of this policy because that is water over the dam. The projects are becoming realities, introducing their products to markets which are not entirely prepared to receive them.

"It is in the public interest that these products be utilized as rapidly as pos-

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sible. Consequently the full cooperation of all the agencies which can contribute to this end, that is federal, state and local governments on the one hand, and distributors of power on the other hand, should be had."

This was part of the generation and transmission group's program. Principal other topic: multi-winding transformers used in conjunction with synchronous condensers for economical voltage regulation at various major points on the power system.

The Weather

Alleged to be a subject of universal interest, the weather was not ignored in technical discussions. "Temperature Survey of the United States" was the joint work of J. J. Smith, General Electric, and H. W. Tenney, Westinghouse. Their conclusion: "Indications are that the ambient of 40 deg. C. selected for general rating purposes is a reasonable one." Someone suggested the possibility of discovering long-period cycles in the nation's temperature, thus designing a machine for the particular age in which it was destined to live.

Protection

Subject of exceptional commendation by the unusually large number of engineers who submitted prepared discussions on the work was "Sensitive Ground Protection for Radial Distribution Feeders" by L. F. Hunt and J. H. Vivian, both of Southern California Edison.

Theirs is a scheme, perfected during several years of successful operation on the Edison system, for relaying ground faults even though an extremely small current flows, and at the same time providing means for limiting the maximum ground current. Especially adopted to the protection of feeders traversing territories such as Southern California's bone-dry hills, the scheme has worked so well that conductor's dropped and contacting a blade of grass have relayed out with no signs of arcing. M. A. Sawyer, Southern Calif. Telephone, pointed out the advantages of such protection where power occupies poles jointly with telephone circuits.

General Electric contributed to the protective devices discussions with two papers describing a magne-blast circuit breaker and a hydro-blast breaker, the latter using water, thus eliminating oil.

Strictly new was Okonite's scheme, whereby lead cable sheathing is processed with sodium, producing, according to Okonite, superior qualities in the finished product. Principal criticism of other manufacturers was that the paper implied inferiority of raw lead whereas high quality lead is available to all manufacturers, and all obtain it from the same sources.

Indications of the scope of material discussed are the number of papers, 43, together with nearly 100 prepared discussions, and the range of general subjects. In addition to those mentioned, group meetings covered: instruments and measurements; radio noise, television; electrical machinery; transportation and lighting; communications and electronics; industrial power.

The Lighter Side

These meetings, and a separate technical session of 54 students who were registered, disposed of the convention's work. But there were afternoons and evenings to be put in, and there were 330 ladies registered, whose technical interests, at least while vacationing in San Francisco, did not run high. Acting as their hostess was Mrs. S. J. Lisberger, in charge of ladies' entertainment.

Culminating event among social activities was the convention banquet, held Thursday evening, where golf and tennis trophies were awarded, and which was followed by entertainment and a dance.

Also, this was an occasion for introducing the Institute's new president-elect, F. Malcolm Farmer, vice-president and chief engineer, Electrical Testing Laboratories, New York. Next year also, the West will have one new representative among the officers: Vice-President H. W. Hitchcock, who is chief engineer, Southern Cal. Tel.

AIEE Personalities

1. A. T. & T.'s H. S. Osborne, Institute director and chairman of the Technical Program Committee, with P. G. and E.'s J. P. Jollyman, vice-president of District 8.
2. J. C. Gaylord and N. B. Hinson, Southern California Edison Co.
3. H. H. Schoolfield, Pac. P. & L. chief engineer, Dean R. H. Dearborn, Oregon State College, and Lester S. Ready, consulting engineer.
4. Sangamo's L. H. Nott and L. T. Merwin, president of Northwestern Electric, Portland.
5. Institute President John C. Parker and General Convention Chairman S. J. Lisberger of P. G. and E.
6. L. J. Moore, chief engineer of San Joaquin Power, and W. C. Lynch, Aluminum Co., Los Angeles.
7. Maydwell & Hartzell's Harry Hartzell and So. Cal. Ed.'s W. H. Frampton.
8. Dean G. L. Sullivan, Univ. of Santa Clara, and William Warren, Univ. of Illinois.
9. Harry Delancey, Maydwell & Hartzell, with W. R. Vanbokkelen, GGIE chief of electricity.
10. Okonite's I. W. Borda, major domo of the Treasure Island party, and G-E's M. S. Barnes, chairman of the Registration Committee.
11. Westinghouse celebrities—Vice-President W. R. Marshall, San Francisco manager W. P. L'Hommedieu, C. M. Laffoon and C. A. Powel, both from East Pittsburgh.
12. Dr. D. M. Simmons, General Cable's chief engineer, and P. G. and E.'s S. J. Lisberger.
13. Pac. P. & L.s H. H. Schoolfield and Pacific Electric's E. F. Sixtus.

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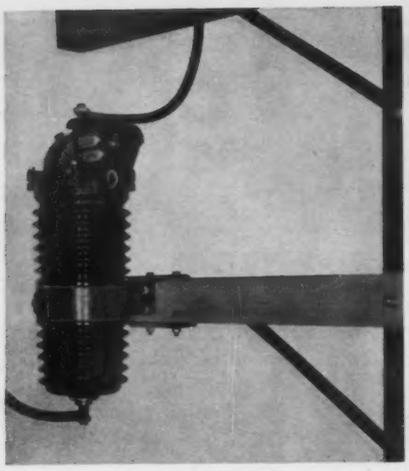
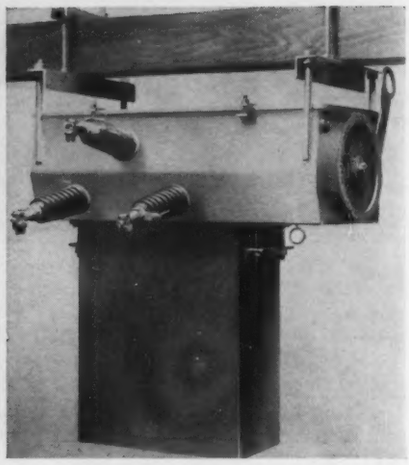
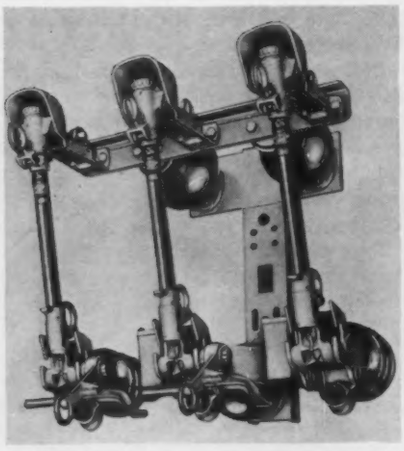
Reclosing OCB's

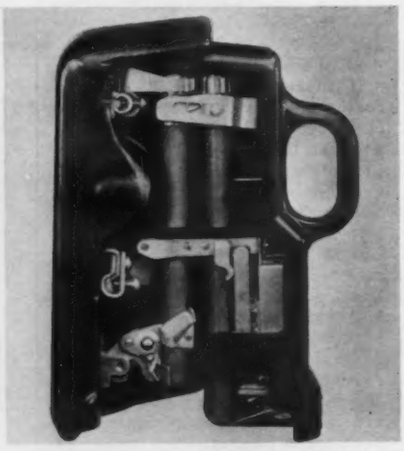


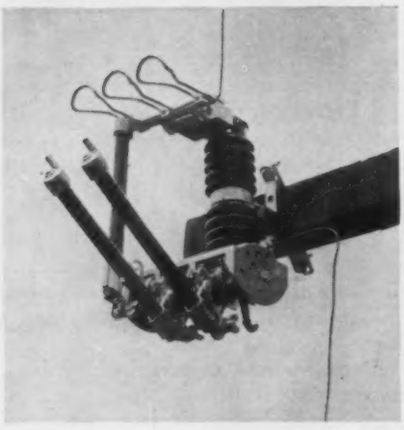


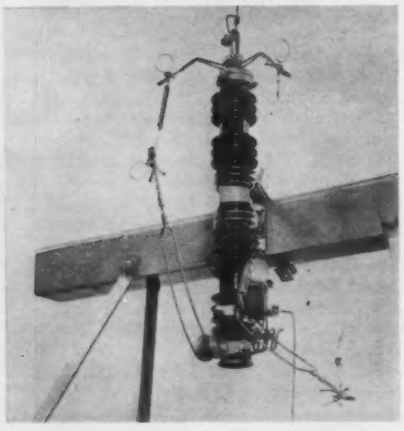
VS.

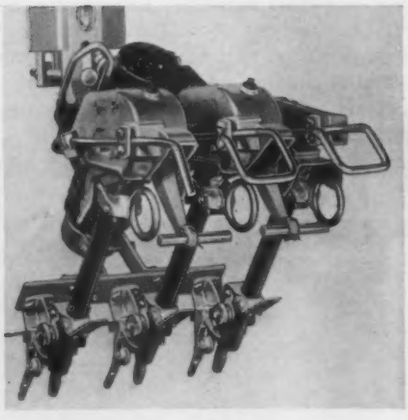
Repeating Fuses

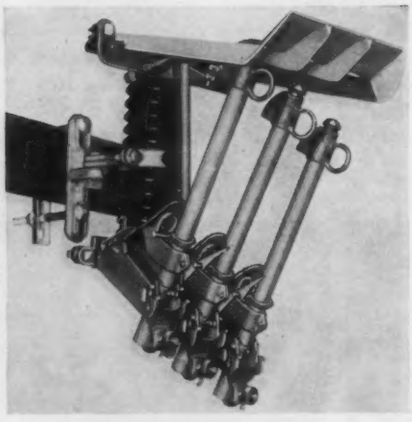












THE success of automatic, reclosing oil circuit breakers for substation use was followed several years ago by reclosing fuses on distribution lines. Four years ago a single-pole, 7,500-volt, 50-amp. oil circuit recloser for pole-top mounting was introduced. A small, inexpensive reclosing oil circuit breaker, 1-, 2-, and 3-pole, 7,500- and 15,000-volt, for pole mounting was introduced a little later. Last year a 15,000-volt, single-pole recloser was introduced. These breakers will all give three reclosures.

RECLOSING BREAKERS (top of page). General Electric's unit (left) is rated 15 kv., 50 amp., single phase, receives operating energy from the circuit. Locks out after third reclosure on dead short, will break 4 or 5 times on light short. Returns to original position if not locked out. Pacific Electric's units (right) are spring operated, either motor or hand wound. Sizes 15 kv. and 7,500/12,500 volts Y, 100 amp., in 1-, 2-, or 3-pole units. Locks out after the third reclosure

REPEATING FUSES (left) are offered by several manufacturers. (Top left): Schweitzer & Conrad, Inc., 3-shot, units of 5 to 46 kv., 50 and 100 amp. (Top right): General Electric, 2-shot, porcelain housed, expulsion type, indicates first shot, drops out on second. (Middle left): Kearney, 3-shot, up to 34.5 kv., 100 amp. (Middle right): Kearney 2-shot "Tripolink." (Bottom left): Line Material, 50 amp., 5 kv., and 100 amp., 15 kv., 3-shot with field — adjustable time delay. Line Material also offers housed 2-shot drop-out units (not shown). (Bottom right): Matthews, 3-shot, drop out, 7.5/12.5 to 15 kv., 50 and 100 amp. Not shown is a fast reclosing non-drop-out unit, in ratings to 34.5 kv.

Other equipment may now be available, but no data are at hand.

An example illustrating the advantages of reclosing equipment on rural lines with which I am familiar has two series sets of reclosing fuses along a 15,000-volt, 15-mi., single-phase line, branching from a 30-mi., 3-phase, 3-wire line. A pole-mounted recloser or service restorer is used at the 150-kva. sub-station supplying the 3-phase line. This breaker has saved six 13-mi. trips in 12 months and 4 to 6 hours of interruption.

Inspection trips at various intervals from a week to 30 days have been made and on three occasions it has been found with one operation, once with two operations and once it locked out when a tree fell over the line. Had this breaker been installed the previous winter, it would have saved a man nine trips, and 18½ hr. in line interruption during the month of February alone, when troubles were numerous. The reclosing of fuses, 4 mi. from end of line, are 8-amp., the other 15-amp., and the breaker coils are 10-amp., with inverse time-delay attachment set to trip at 100 amp. in 0.3 sec.

Repeating fuses are made in 50- and 100-amp. sizes with either one or two reclosures. Some repeat in from 20 to 40 cycles with no intentional built-in time-delay, and others have an adjustable delay between reclosures.

The main purpose of all these reclosures is to meet the demand for better service, to save traveling time to refuse or close breakers manually and to safeguard life and property. Reduction in outage time is a big item in good customer relations. With a fuse or breaker that will reclose within a second after a fault starts, the interruption in most cases will hardly be noticed, and motors, if provided with time-delay undervoltage release, will not have to be restarted.

Repeating fuses, because of their low cost, fit in best on small, branch single-phase lines. For the more important single-phase branches, single- or 2-pole breakers can be used.

With rural lines it is important from both a service standpoint and hazard to the public to get a line open whenever one wire becomes grounded. This can be done when there is a grounded supply, but is very difficult on long lines where there is high ground resistance due to a long season of dry weather or to rocky soil. In such cases it is very important that the fuse or breaker open up on current values not too much above the normal rating.

Where there are repeating or other fuses beyond a reclosing breaker it is necessary that the tripping time of the breaker and the clearing time of the fuses be properly coordinated.

It is to be noted that there is considerable difference in the operating characteristics between fuses of different makes, and there is more chance of a lack of coordination where fuses are used to sectionalize a line than where reclosing breakers are installed.

The principle of operation of repeating fuses is as follows: Either two or three fuse tubes are mounted close together. When a fault or overload occurs the circuit is cleared by the blowing of the fuse link. The link is under tension and the releasing of this tension allows the cartridge to drop out or fall away from the upper contact, and in falling causes the circuit to be reclosed through a second fuse. With 3-shot fuses a third is put in circuit after the second one blows.

After the first link clears there is either an inherent delay of 20 to 40 cycles or a bellows with adjustment from 0 to 1 sec. or an interval of 1 sec.

Table I—Typical Prices of Reclosing Oil Breakers

Rating			Min. Trip	Interrupt	Coils Avail.	Approx.
Volts	Poles	Amps.	(Amp.)	(Rated Amp.)	(Amp.)	Price
7500	1	50	15-140	125-1200	4-8-15-25-50	$100
15000	1	50	20-130	150-1200	6-12-25-50	120
7500/12500Y	1	100	10	1200	10-25-50-100	180
7500/12500Y	2	100	10	1200	10-25-50-100	200
7500/12500Y	3	100	10	1200	10-25-50-100	260
15000	1	100	10	1200	10-25-50-100	290
15000	2	100	10	1200	10-25-50-100	320
15000	3	100	10	1200	10-25-50-100	380
*7500/12500Y	2	100	10	1200	10-25-50-100	400
*7500/12500Y	3	100	10	1200	10-25-50-100	460
*15000	2	100	10	1200	10-25-50-100	520
*15000	3	100	10	1200	10-25-50-100	580

*Motor operated, automatically reset.

By R. S. Daniels

Reclosing fuses are subject to personal errors of the man who puts in the links. Since all types of drop-out fuses depend on a certain tension in the link, to hold the tube in the closed position, too much slack left in the link may cause excessive heating, burned contacts, radio interference, and the possibility of a premature outage.

Repeating fuses are much cheaper than any type of reclosing breaker. Breakers, however, are automatically reset, while the fuses have to be replaced manually after every second or third shot.

Operating Reports

One company reported on five breakers in service one year or over, and stated that in about 80% of all cases service had been restored on the first or second reclosure, with lock-outs only on permanent faults which had to be cleared before the line could be put back in service. All these breakers handled 3-phase branch lines. They were adjusted for one immediate reclosure and for 10-sec. delay between the others. This company reports one set of 15-kv. reclosing fuses in service only a few months.

Another company reports very fully on six restorers in service a little over one year; three in substation use and three in line service; five at 6,900 volts, 3-phase and one at 6,900 volts, single-phase. They were enthusiastic over results.

This group were reset during the year a total of 53 times as follows:

28 resettings after 1 reclosure
6 resettings after 2 reclosures
1 resetting after 3 reclosures
18 resettings after a lock-out

Three of these were at attended substations.

A third company reports satisfactory operation on five restorers, all used for about one year on the low side of 600-kva. rural substations. It also has the following repeating fuse installations, all three-phase:

Six on 24,000-volt lines
Two on 11,000-volt lines
Four on 6,900-volt lines
Three on 2,400-volt lines

It states that while their experience with these fuses to date has been

Table II—Typical Prices of Repeating Fuses

Volts	Amps.	Type	Insulation	Reclose	Price
5000	50	Enclosed	Porc. box	1	$13 to $20
5000	50	Open	1 post. insul.	2	$40
5000	100	Open	1 post. insul.	2	$40
7500/12500Y	50	Enclosed	Porc. box	1	$15
7500/12500Y	50	Open	1 post insul.	2	$39 to $47
7500/12500Y	100	Open	1 post insul.	2	$47
15000	50	Open	1 post insul.	2	$55
15000	100	Open	1 post insul.	2	$45 to $55
15000	100	Open	2 post insul.	2	$53

NORTHWEST ASSN. REPORT

This article on fuses and breakers is one of the papers presented by the Transmission and Distribution Committee (R. J. Davidson, chairman) at the 1939 meeting of the Engineering & Operation Section, Northwest Electric Light & Power Assn. R. S. Daniels is with the California-Oregon Power Co.

satisfactory, they do not feel that the installations have been in service long enough to give any definite conclusions.

A fourth company reports four restorers in service over a year, with 11 interruptions on one and 10 on the other three during 1938. A fifth breaker has just been installed. These are all evidently in use on main and branch lines and one is motor-operated. No trouble was experienced. It also has three 22,000-volt, 3-phase lines equipped with repeating fuses, and there were 14 interruptions during the year 1938. Mechanical trouble was experienced with one set of fuses. This company recommends the use of reclosing breakers in place of fuses on the longer and more important lines.

One company states it normally plans on using reclosing oil breakers on main lines having a capacity of 75 kva. or over, and on using repeating fuses on both single- and 3-phase branch lines with capacity less than 75-kva.

Two companies report the use of a few repeating fuses with adjustable time delay between reclosures.

My own company has 18 repeating fuse installations. Operation has been very satisfactory and has resulted in saving many trips to restore service. Nearly all are on 3-phase, 11,000-volt lines.

One of the first of our installations was at the supply end of a 3-phase, 23,000-volt 25-mi. line. Probably about 30 interruptions of at least 1-hr. duration to two rural communities and three sawmills were saved by these repeaters, as well as 20 or more 40-mi. trips for the trouble man during two years operation. Records were kept of interruptions to service, of which there were 12 during two years, and it is estimated that about 30 interruptions were saved by first and second reclosures. Most of the momentary outages were due to eagles roosting on the cross arms and shorting up the wires when they would stretch their wings in the morning.

I believe that repeating fuses and low-cost reclosing breakers have both demonstrated that they are of considerable aid to good service and will in general save from one-half to three-fourths of the interruptions. Fuses are not so well adapted to three-phase lines as are 3-pole breakers, but all except three of the 38 installations that I have been able to get a report on have been on 3-phase lines. The operation of all has been stated as satisfactory, except one case of mechanical trouble and twice where one set was improperly fused, and one set without a sleet hood failed to open once when it was iced over.

Table III covers a partial record of 38 repeating fuse installations.

Advantage of Breakers

The advantage of reclosing breakers or service restorers over plain automatic breakers lies in their ability to restore service without locking out. Only a small amount of detail data on restorers is available, but accurate and complete records of eight installations, most of them for a period of 15 months, show that in about two-thirds of the line interruptions, service will be restored on the first or second reclosure and for one-third there will be lock-outs.

Thirty-five repeating-fuse, 3-phase installations were reported and three single-phase. No definite data were given as to the number of successful restorations without locking out. For my own company, exact records are not available, but in practically all instances where there was no permanent fault, service was restored on the first reclosure.

Records in detail covering all reclosures are available for a total of only eight restorers in service from one to two years, all 3-phase. These breakers were reset 65 times; 34 after one reclosure, 7 after two reclosures and one was reset after it had reclosed three times. When a restorer is found in a position showing that it has reclosed twice, it means either two separate cases of line trouble or one fault with two rapid reclosures. Assuming for the above group of eight that when reset after two reclosures a large majority represent two separate faults which held on the first reclosure, we get an approximate total of 72 cases of trouble in which 63% held on the first reclosure, 5% on the second and 1½% on the third, while 23 or 32% were lock-outs.

Table IV summarizes most of the information available from five companies, covering 25 3-pole breakers in service from 1 to 2½ years.

Table III—Record of Repeating-Fuse Installations

Co.	No. of Installations	Line Phase	Line Voltage	Age	Operations	Remarks
A	1	3				Experimental Installation
B	6	3	24000			Operation Satisfactory
B	2	3	11000			Operation Satisfactory
B	4	3	6900			Operation Satisfactory
B	3	3	2400			Operation Satisfactory
C	1	3	23000	2 yr.	42 (Est.)	Two failures due improper Fusing. All fuses one leg blown 12 times.
C	1	1	11000	2 mo.	0	Operation satisfactory
C	2	1	11000	1 yr.	2	Operation satisfactory
C	13	3	11000	1-2 yr.		Operation satisfactory
C	1	3	2300	2 yr.		Operation satisfactory
D	3	3	22000	1 yr.	14	Mech. trouble, one installation. Balance satisfactory.
E	1	3	13200	3 mo.	0	2 sec. delay between shots
	38					

Table IV—Record of 25 Restorers

No.	Co.	Location	Line Phase	Line Volts	No. of Resettings* 1	2	3	Lock outs	Total	Attended	Age
1	A	Substa.	3	6900	14	1		4	19	Yes	15 Mo.
2	A	Substa.	3	6900	5	1		4	10	Yes	15 Mo.
3	A	Substa.	3	6900	4	0	1	4	9	Yes	15 Mo.
4	A	Substa.	3	6900	2	2		1	5	No	15 Mo.
5	A	Substa.	3	6900	1	2		4	7	No	15 Mo.
6	A	Line	1	6900	2	0		1	3	No	15 Mo.
7	A	Line	3	11000							2½ Yr.
8	A	Line	3	11000							2½ Yr.
9	B	Substa.	1	11000	3	0		4	7	Yes	2 Yr.
10	B	Substa.	3	11000	3	1		1	5	No	1 Yr.
11	C	Substa.	3								1 Yr.
12	C	Substa.	3								1 Yr.
13	C	Substa.	3								1 Yr.
14	C	Substa.	3								1 Yr.
15	C	Substa.	3								1 Yr.
16	D		3	11000					11		1 Yr.
17	D		3	6600							1 Yr.
18	D		3	11000					1		1 Yr.
19	D		3	11000					3		1 Yr.
20	D		3	11000					6		1 Yr.
21	E	Line	3	13800							1 Yr.
22	E	Line	3	13800	Service said to be restored in 80% of all cases on 1st or 2nd reclosure.						1 Yr.
23	E	Line	3	13800							1 Yr.
24	E	Line	3	13800							1 Yr.
25	E	Line	3	13800							1 Yr.

* Col. 1 = 1st reclosure, 2 = 2nd, 3 = 3rd.

Two-Source Service for KNX

Relay scheme greatly simplifies control for preferred-emergency or loop operation

By L. F. Hunt and J. H. Vivian

TO PROVIDE a highly reliable source of power for the new 50,000-watt, Columbia Broadcasting Station, KNX, Torrance and Redondo, Calif., a consumer-type substation embodying a somewhat unusual relaying scheme has been placed in service by Southern California Edison Co.

Two 16-kv. lines are used as feeders, each originating from a separate station. At present, it is desired to operate with only one closed feeder, known as the preferred line. The other (emergency) line is energized from the source side, but is normally open at KNX.

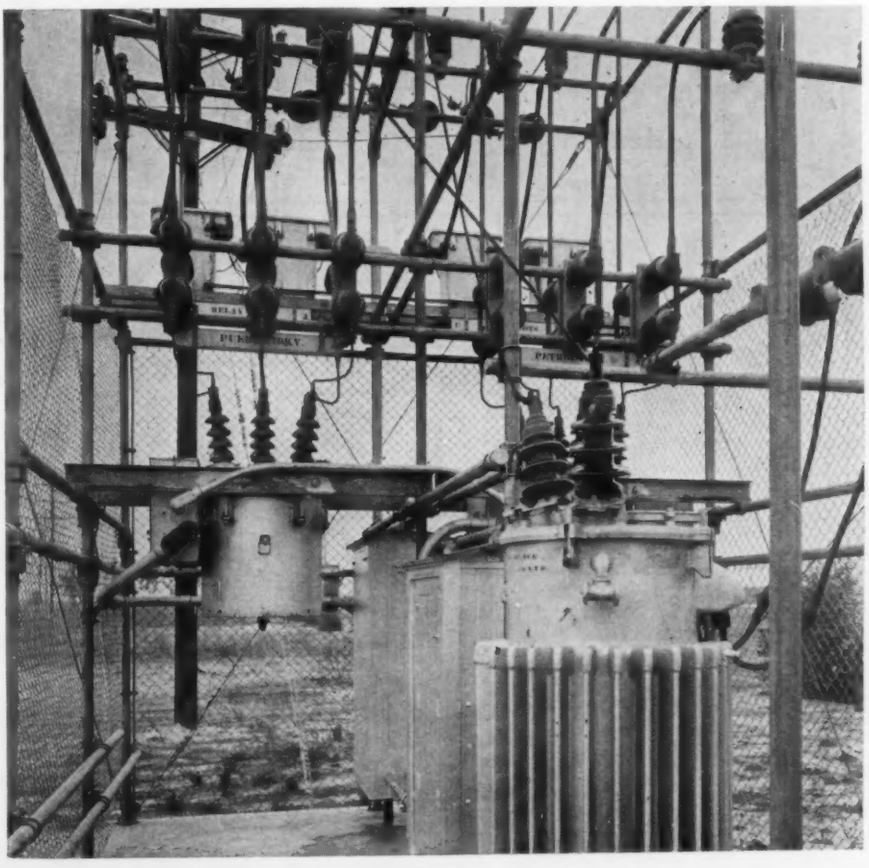
During abnormal operating conditions and perhaps for normal operation at a later date, it may be necessary to parallel the feeders at KNX.

A flexible control and relay system has been provided which will permit operation of the station on either preferred-emergency service or on loop service. This change in service may be selected by means of a six-pole, double-throw knife switch located on the relay board.

The station is not entirely automatic because the operating engineers of KNX requested that they be given certain control of the feeder circuits. They felt that, if service was automatically changed from preferred to emergency during a program, they would rather restore preferred service at their convenience. The relay timing is such that the two feeders are paralleled for three cycles during the above transition.

A feature of the design is that by use of a set of 16-kv. by-pass disconnects and secondary control switches (and knife switches) all equipment can be tested without impairing service. Relays may be tested without disconnecting switchboard wiring.

Two 16-kv./110-volt potential transformers are connected in open delta on each line. These transformers will, of course, be energized when their respective lines are energized. A type CP 3-phase voltage relay having front and back contacts is connected to each set of potential transformers. Three-phase relays are used to prevent reclosing when one phase is open circuited or should the feeders become cross-phased.



(Top of page) KNX broadcasting station, with feeders and substation to the right of the building. (Right) Close-up of substation. Oil switch is the one for opening and reclosing the preferred circuit. Only one transformer is shown. Beyond it are battery and relay cabinets. Potential transformers and disconnects appear in the structure above

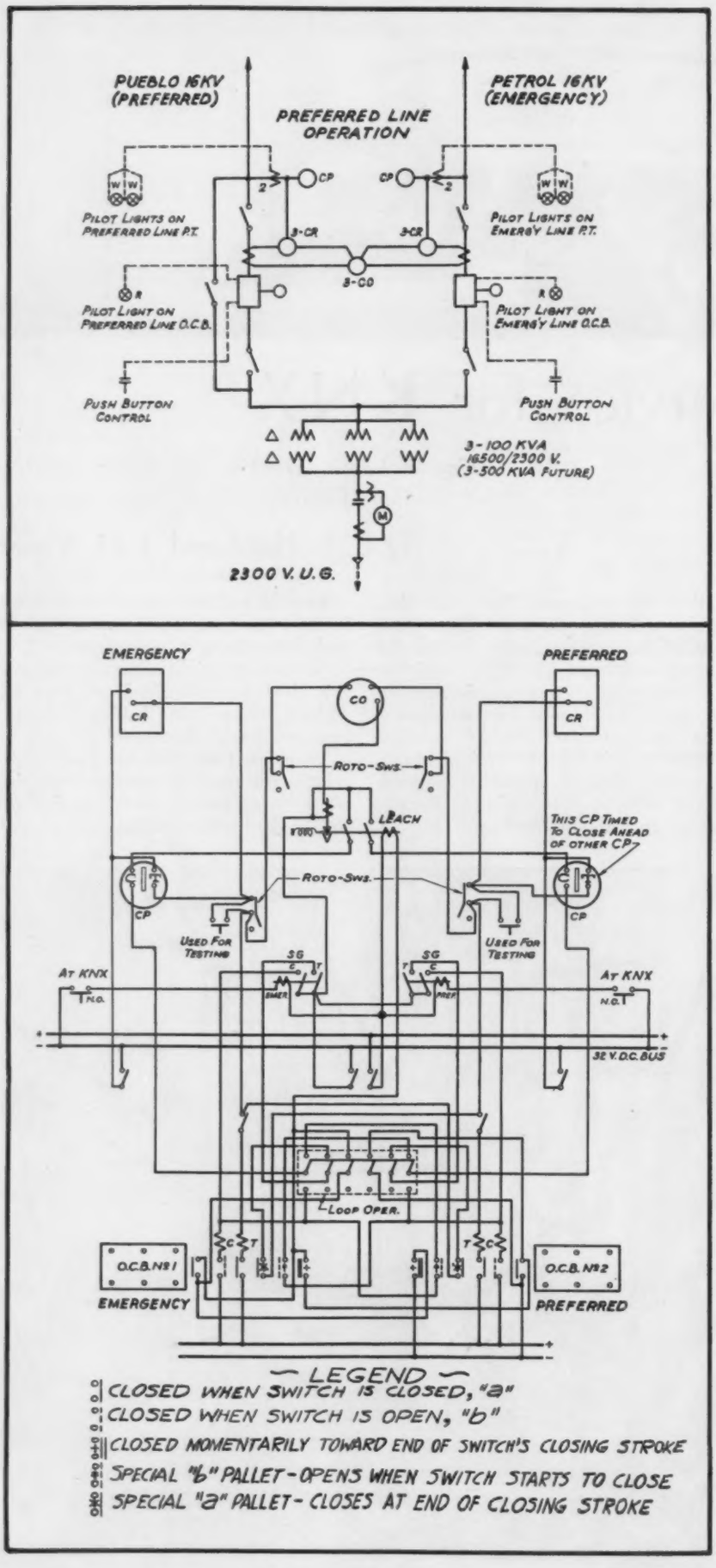


Fig. 1—(top) Feeds to power-directional and transformer-overload relays. Fig. 2—(bottom) Schematic diagram of relay protection

The front contacts are connected in a 32-volt d.c. circuit to close its corresponding line breaker and the back contacts are connected to trip the breaker. Potential for the CR power-directional relays, used in loop service, is also taken from the line-potential transformers.

Wound-type bushing current transformers are used in each oil switch. The currents for the power-directional relays and the transformer-overload relays are fed from these transformers as shown in Fig. 1.

The pallet switches, shown in Fig. 2, are silver plated and adjustments are made in the field to insure correct operating sequences. Two of the "b" type are marked ‡. These particular pallets are adjusted to open immediately when the breaker starts to close. This definitely blocks the second switch once the selected switch has started to close. For example: both lines would parallel if a previously de-energized CP relay became energized before the selected switch closed.

The pallet switches which are marked (+) are adjusted to reset the Leach relay toward the end of the closing stroke. This adjustment should be made so that the Leach relay could not be reset until the "b" type pallet marked (‡) opens. This is another safety factor to prevent both switches from closing when only one switch is selected to close.

Tracing the sequence of relay operations under the following typical operating conditions makes it easier to understand the flexibility of this type of station. All control switches and knife switches are assumed to be closed as in normal operation.

CASE 1

Both lines energized from sources KNX operating on preferred line Six-pole switch closed upward

With both lines energized the two CP relays will have their contacts closed to the C side. If the preferred line goes dead, the CP relay connected to the preferred line will close to the T position. The preferred switch trips out and, toward the end of the opening stroke, the b pallet marked (‡) closes. This pallet switch completes the closing circuit to the emergency circuit.

Some time later, the preferred circuit will again be energized from the source station. The preferred CP relay will close to the C position. However, no change in service occurs because the "b" pallet, marked (‡), on the emergency switch is open.

Let us now assume that the emergency circuit becomes de-energized. The emergency CP relay closes its contact to the T position which causes the emergency switch to trip. As before, the emergency "b" pallet marked (‡) closes when the switch is open which

Table I—CP Relay Settings

Preferred Line	Emergency Line
Left Lever (trip) 1.3 DIV.	Left Lever (trip) .8 DIV.
Right Lever (close) 3 DIV.	Right Lever (close) 3.0 DIV.
Relay closes @ 80 v. or more.	Relay closes @ 80 v. or more.
Relay trips less than 65 v.	Relay trips less than 65 v.
Closes 120 v. in 1.2 sec.	Closes 120 v. in 2.3 sec.
Closes 100 v. in 2.0 sec.	Closes 100 v. in 3.8 sec.
Closes 80 v. in 8.0 sec.	Closes 80 v. in 14.2 sec.

completes the closing circuit to the preferred switch.

The emergency circuit again becomes energized; the emergency CP closes its contacts to the C position, but no change-over takes place for similar reasons as given before. (The "b" pallet marked ‡ on the preferred switch is open.)

Regardless of whether the station is operating on preferred or emergency service, if both lines go dead, the closed switch will open. Referring to Fig. 2, it will be observed that the switch will be closed to the first line coming hot. (Both "b" pallets are closed because both oil switches are open when lines are de-energized.) Should both feeders become energized at the same time, only the preferred circuit will be closed to the station bus. This is accomplished by selective settings on the CP relays, as given in Table I.

It takes 2 sec. for the CP relay to go to the trip position from the full closed position when the line goes completely dead, but it takes 33 sec. for the contacts to travel to the trip position from the closed position when the secondary voltage is 65 volts.

CASE 2

Both lines energized from sources KNX operating on emergency line Six-pole switch closed upward

It will be noted in Fig. 3 that the operator at KNX has two white lamps connected across the potential transformers on each line. From this indication he may always know which lines are energized. He also has a red indicating lamp coming from the breaker which is closed. The two push buttons for his use are located on the same panel as are the indicating lights.

At a convenient time, he desires to switch over to the preferred line; after observing the correct indications on the lamps, he simply pushes the preferred control button. This operation causes the breakers to parallel for three cycles and automatically opens the emergency switch.

This operation is quite plain in Fig. 2. The push button closed the preferred SG relay. The contacts of the SG are connected to both a closed and open circuit through pallet switches. The preferred switch closed first which caused the special "a" pallet, marked (*), to close.

The closing of this pallet completed the tripping circuit to the emergency switch. It is very important that the special "a" pallet be adjustable so that correct paralleling is assured.

Should the operator desire to change back to the emergency circuit, he needs only to press the push button marked emergency. Again, the switches will be paralleled for 3 cycles.

CASE 3

Both lines energized from sources KNX operating on either line Six-pole switch closed upward

The transformer overload relays will operate in case of bank overload, bus failure or because of a low-side switch failure.

In case these relays operate, the switches will not automatically reclose. The operator must reclose one of the lines.

The coil of the Leach relay is in the common wire to the CO relay, so regardless of which switch trips by overload the contacts of the Leach relay are opened. Because the CP closing circuits are in series with the contacts of the Leach relay, the switches cannot reclose by CP relay operation.

Regardless of which line the operator should choose to test the circuit, we shall find the Leach relay resetting by means of the momentary pallet switches on either oil switch marked (+). The setting of this pallet was explained previously. Such a wiring scheme prevents pumping and yet the automatic equipment is always available when it can be used to advantage. It should be noted that the d.c. to the overload relays is always directly connected and is always available to give overload protection, no matter what operating sequence may be taking place.

CASE 4

Both lines energized from sources KNX fed by both lines (Loop) Six-pole switch closed downward

The CR power directional relays are now required to operate in order to clear the faults which occur on either of the feeder circuits.

Assume that the preferred line trips automatically at both ends of the line. The CP relay on the preferred circuit closes its contacts to the T position. When the preferred line again becomes energized, the oil switch will reclose. The same operation takes place if the emergency line should relay.

If both lines go dead at the same time, both switches will open. The circuit was designed this way so that the loop would be broken at KNX in case of system trouble. It is possible that one feeder would be fed from steam, the other from hydro. However, the station will be closed to the first hot line. When the second line is energized it will automatically be closed in parallel. If both lines come hot together, the preferred line will close first, then the emergency line will reclose when the CP timing is complete.

CASE 5

Both lines energized from sources KNX fed by both lines (Loop) Six-pole switch closed downward

Assuming that the transformer overload relays operate, we note that again the Leach relay contacts will have opened as before. One of the switches must be reclosed by the operator to test the bank. It should be noted that the Leach relay will not reset during the closing stroke of the first switch operated. The emergency switch will be open if he has closed the preferred or vice versa; therefore, the type "a" pallet will be open on the open switch; as the six-pole switch is in the lower position, the reset circuit is not complete. The circuit is so designed to prevent the second switch from closing before the operator is ready to have it closed. Should the bank relay on test, with a circuit not so designed, the bank would again be tested when the second switch closed. When the operator closes the second switch, the Leach relay will automatically reset itself. This operation occurs automatically because the "a" type pallet on the closed switch completes the Leach reset circuit.

Many other cases could be given, but they would be more or less special and perhaps not of particular interest. It may be mentioned, however, that the scheme has worked very satisfactorily to date and from the results, similar wiring diagrams are being made.

However, the wiring at KNX was designed for a special case. If operators are not available, the fundamental design adapts itself readily to automatic reclosing after transformer overload relay operation. Also, such a station can be wired to be kept operating on the preferred line whenever the preferred service is available.

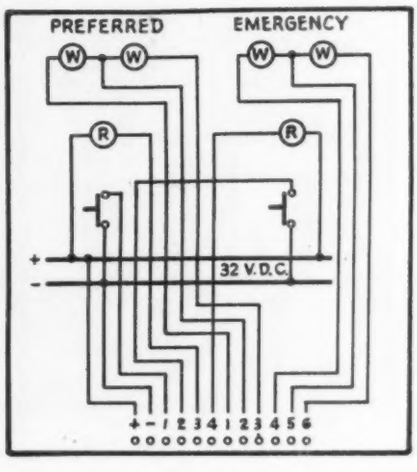


Fig. 3—Partial wiring diagram of indicating equipment for the consumer as installed at KNX

Adequate Wiring

Gets a big boost in Seattle through work on whole industry

The Adequate Wiring Bureau booth, a striking illuminated display, was lighted with fluorescent tubing in four colors, green, gold, daylight and white

Adequate wiring is now visualized in definite terms by thousands of Seattle prospective home buyers and professional builders as the result of attention-compelling displays sponsored by a united electrical industry at the National Housing Exposition held in Seattle's civic auditorium.

A total of 77,540 paid admissions were recorded at the exposition, held under auspices of the Seattle Master Builders and the Seattle *Post-Intelligencer*. The attendance was gratifying to electrical exhibitors who contributed freely of time and material to an Adequate Wiring booth and to equipping a "Model Budget Home," which was certified as to adequacy of wiring.

Participating in construction and equipping the booth were the Seattle Electrical Contractors Assn., Seattle City Light, Puget Sound Power & Light, a group of six wholesalers, the Electric Club of Washington and the International Brotherhood of Electrical Workers (Local 46).

Wholesalers aiding included Graybar, Globe Electric, G.E. Supply, North Coast Electric, Palmer Electric and Westinghouse Electric Supply.

General supervision of booth construction and operation during the exposition was the adequate wiring committee of the Electric Club, of which R. D. Horning, secretary-manager of the Seattle Electrical Contractors Assn., is chairman. Members of the committee are: Clyde Wood, Westinghouse Electric & Mfg. Co.; James H. Kelley, Graybar; T. M. Widrig, Trumbull Electric Mfg. Co.; Newt Congdon, Prottas & Levitt Bros.; William S. Gaunt, IBEW, Local 46; L. M. Wolfe, Anaconda Wire & Cable; Larry Muth, City Light; W. H. Flood, Puget Sound Power, and R. U. Muffley ex-officio.

Another integral part of the adequate wiring story at the exposition was the equipment in the "Model Budget Home"—a full-sized five-room house—which was erected on the floor of the civic auditorium. Signs at all switches within the house directed attention to the adequate wiring behind the walls.

Mounted adequate wiring certificates were displayed in conspicuous manner in the extensive floor displays of both Puget Sound Power & Light Co. and Seattle City Light.

Prior to the exposition personal letters were sent to all architects in the Seattle territory by President R. U. Muffley, of the Electric Club, in private life, commercial manager of the central division, Puget Sound Power & Light. Emphasizing the coming exposition these letters also stressed the importance of adequate wiring in modern home buildings and urged all architects to seek detailed information on the advantages of "AW" certification.

Three Seattle fixture firms, Cascade Fixture, Dwyer Lighting Equipment, and the Seattle Lighting Fixture, cooperated in equipping the booth with latest-type residential fixtures in addition to the striking fluorescent displays. Harry Lynde, Cascade Fixture, designed the booth.

The IBEW contributed free labor to installations in both booth and model home was a gesture from organized labor toward promotion of improved building and electrical installation.

A representative group of electrical manufacturers supplied equipment for the "Model Budget Home," under supervision of T. M. Widrig. These firms included: Allied Industries; Anaconda Wire & Cable Co.; Appleton Electric Co.; Arrow, Hart & Hegeman Co.; Bryant Electric Co.; Columbia Steel Co.; Edwards & Co.; Garnett Young & Co.; General Electric Co. (Appliance and Merchandise Division); Habirshaw Cable and Wire Corp.; National Electrical Products Co.; The Okonite Co.; John A. Roebling's Son Co.; Robinson Sales Co.; Steel & Tubes, Inc.; Triangle Conduit & Cable Co.; The Trumbull Electric Manufacturing Co.; Westinghouse Electric & Manufacturing Co.; Wiremold; U. S. Rubber Products Co., and Wesix Electric Heater Co.

Wiring corner of the display; note materials and the selling story on placard

Commercial Lighting

Pacific Power & Light Co. staff follow up on new installations

Whenever Pacific Power & Light Co.'s commercial lighting staff sells a good job of lighting, it uses that job to advertise "better light for more sales" and to sell other installations.

Particularly dramatic was the change in the appearance of Star Clothing Co., Yakima, Wash. When the store had been relighted and air conditioned, a pamphlet was published containing the contrasting pictures and details of the service costs. This was tied in with a rate-reduction announcement made in March.

"In the 12 months ended Feb. 29, 1936," the pamphlet tells, "the Star Clothing Co. used 17,832 kw.-hr. for lighting at a cost of $818.02. Today this progressive store is using 38,560 kw.-hr. a year for lighting and the cost at the new low rates effective March 1 is $1,005.02. Use of electricity for lighting increased 116%. Cost of service increased only 22%. And for this small additional cost they have increased their interior lighting, relighted the show windows and installed two new electric signs!"

Lighting Salesman Owen O. Carpenter, of Yakima, had some unusual problems to meet in relighting this store. The office was on a mezzanine just above the front windows. It was necessary to get as much daylight into this office as possible, and yet to use the space for a sign at night. A light box was obviously out of the question, since it would have made the interior dark. So glass-brick frontage was the solution in that it permits entrance of light in the daytime and forms the background for the silhouette sign at night.

Two rows of lighting units were used, one above the glass-brick section and one below it at the floor. Back of the upper row was placed a wide roller screen, the outside surface of which was painted white. During the day this screen is rolled up out of the way. At night it is pulled down to the floor and forms the back of a light box to illuminate the sign.

In the windows new lighting consists of forty-five 150-watt reflectors on 12-in. centers and eighteen 200-watt window reflectors on 16-in. centers. Those which can be seen by pedestrians are louvered to protect the vision.

Air conditioning was installed at the same time and the building completely rewired to take care of an eventual reconditioning of the entire interior lighting. This interior lighting is being done over section by section.

Store front of Star Clothing Co. in Seattle after a relighting job by Pacific Power & Light Co. Note clever handling of glass bricks

Rewiring On Time

Puget Sound Power & Light area takes on new EFHA finance plan

Rewiring of a residence can be carried on time payments in the territory of Puget Sound Power & Light Co. under its EFHA financing plan. Sixty-eight electrical contractors in Puget Sound Power & Light territory voted last March to use the new form of agreement made available to them.

Financing of appliance sales by EFHA began July, 1938, after announcements through the press, meetings of contractors, dealers, wholesalers and manufacturers were held. Appointment of local authorities for handling of the EFHA loans were made and 100 dealer applications came in. Twenty appliances were listed as suitable for financing under the plan. In September, by a new agreement, wiring and modernization of residences and farm buildings were open for similar financing.

Such time payment possibilities provide a vehicle for overcoming selling resistance where wiring is involved in the sale of major appliances or reconditioning a kitchen. They also enable contractors to sell a fully adequate job rather than just a patchwork or piece-meal job. On the appliance side it makes ensemble selling easier. Dealers only use this financing plan. The power company finances its own paper. The plan has been found particularly helpful to rural dealers since it applies on farm equipment as well as electric appliances.

Billing is done by the power company on a post-card bill which is sent out concurrently with the electric light bill. The accounts are separated from the electric accounts in order to prevent confusion in the company's books. However, because the customer receives them simultaneously, the record of payment has been excellent.

Wiring Survey

Loan association survey shows home-builders outlet conscious

Always encouraging is the knowledge that the public wants what the electrical industry thinks it should have—adequate wiring. Very encouraging, therefore, is a booklet, "Changes We Would Make in Building Again," published as a result of a survey by the First Federal Savings & Loan Assn. in Salt Lake City.

Listing items they would include if they were to build again, hundreds of home-owners gave prominent mention to electrical outlets and lighting. Practically every room in the house was singled out as needing more adequacy and, especially, outlets.

Forty-one per cent of those answering wanted more outlets in the living room; 8½% wanted more in the dining room; 15½% wanted a light over the sink; 10% wanted larger kitchens; 8½% wanted more outlets in the kitchen, and 5½% wanted electric lighting over the stove. More outlets were desired in the bedroom by 12½%, and in the bathroom by 4%.

Wiring Specifications

Spokane AWB issues time-saving wiring specification sheet

After finding that specifications for the wiring of a new home are the exception rather than the rule, and that such specifications as are prepared usually date prior to the war, the Spokane AWB is issuing a concise electrical wiring specification sheet which it is placing in the hands of all architects, builders, electrical contractors, and through local building materials people to the general public.

On one side of the sheet is a clever chart on which the rooms, or areas of a house are listed and a contractor, or the home builder may check what is wanted in the way of lighting outlets, closet lights, convenience outlets, wall switches, special outlets, kinds of plates, and special items to be furnished by the contractor such as fans, ranges, water heaters, furnace, etc.

On the reverse side are the condensed electrical wiring specifications. In these, spaces are left blank for filling in the amount in a proposal for lighting fixtures, what the main distribution center is to obtain, a list of circuits in the distribution center, the proper circuit capacity for the various circuits and a list of wiring devices and equals to be specified. Filled in by the owner, or contractor, the form can be used as a contract when accepted and signed by the owner and contractor. This short specification form is finding favor among the contractors and architects.

Promotion Dividends

Certified wired homes lead to greater appliance sales

That adequate wiring promotional work is actually paying dividends has been proved to the satisfaction of H. H. Douglas, Southern California Edison Co., and R. H. Cockfield, Bureau of Power & Light, in charge of wiring promotion for these two utilities. Fourteen out of the fifteen certified homes now being wired, according to the adequate wiring specifications per week in Southern California, end up with electrical ranges; six out of the fifteen with electric water heating, and eight with auxiliary heating in the bathroom, breakfast nook, or bedrooms. Likewise for every certificate issued, two other jobs are greatly improved over the original specifications, and many are being wired for range, water heater, or auxiliary air heat.

C. A. ROWLEY, former Pasadena electrical contractor, is conducting a wiring school for architects in Pasadena under the auspices of the Architects' Assn. The course consists of a series of ten lessons, starting with applied electricity as it pertains to residential wiring. Classes are held Monday evenings at the Muir Technical School, although it is not connected with the school system, but arranged by the architects themselves. Seventeen architects and two general contractors take the course. A similar course is planned by the Los Angeles Architectural Draftsmen's Assn. in the fall.

A POTENT LITTLE pamphlet on adequate wiring has been issued by the Rocky Mountain Electrical League and will be distributed throughout the League territory of Colorado, New Mexico, Wyoming and South Dakota among retail stores, distributors, electrical contractors, utilities, home owners, architects and the general public. The pamphlet is in four pages, the first of which, under the heading of "You Wouldn't Depend on a ¼-in. Pipe for Your Water," shows the need for adequate copper. The second page contains the schedule of what a modern home should have in the way of ceiling, wall, switch, and duplex convenience outlets, room-by-room. On third page is a cost table for operation of electrical appliances under the particular locality's rate in which the pamphlet is distributed, while the last page tells a concise story on "The Importance and Economy of Electric Wiring."

LIGHTING FIXTURE INDUSTRIES of Southern California is circularizing architects and the building profession with a neat letter setting forth the advantages of appropriate lighting fixtures in a home and recommending wiring outlets for such fixtures. In a 4-page folder letter, the 1st page makes a dignified plea to architects for proper consideration of correct lighting fixtures from the viewpoint of architecture, decoration, design, workmanship, illumination, and cost. The inner spread contains a layout of typical rooms of a home on which are spotted the fixture outlets and also the convenience outlets recommended for satisfactory use of appliances. In large display letters are recommended percentages of the building budget that should be devoted to lighting fixtures. The last page contains a list of members of the Lighting Fixture Industries of Southern California, their addresses and telephone numbers.

MORE THAN 1,300,000 copies of the educational booklet "Seeing", prepared and distributed by Western Institute of Light & Vision, have been distributed throughout the U. S. and several foreign countries. The booklet has gone into its 47th edition and is still in active demand.

LEONARD A. HOBBS, Smoot-Holman Co., chairman of a school lighting committee of the San Francisco Bay Cities Section of IES, gave a preview presentation of his paper to the June 9 meeting, at the Stewart Hotel. He later presented the same paper to the meeting of the Pacific Division, NEWA, at Del Monte, June 16.

First major fluorescent installation in the Northwest was made in the Yamhill, Ore., store of Fred Meyer, food-store operator of Portland and vicinity. The lamps—47 of the 208-volt type and 11 of the 120-volt type—were installed in the low-ceilinged candy-wine-tobacco department. Total cost of the job was between $500 and $600; ft.-candles furnished are between 50 and 60. E. M. Kerr (above), lighting sales engineer for General Electric Supply Corp., Portland, landed the order with the help of his fluorescent-lamp demonstrator equipment

Sterilizing by Ultraviolet

Sensational Rentschler-James process promises mankind bacteria-less world

By W. C. McHenry

MEN of modern medicine and science have combined forces to supply powerful weapons to control harmful bacterial action. Unlike Pasteur, Lister and others, who fought ignorance and prejudice in their own pioneering sterilization work, today's experimentalists are highly respected, for the man in the street knows he walks about in a vast, contaminated sea of floating bacteria.

To heat and chemical methods of sterilization, which are two-dimensional in action, and limited to small areas and surfaces, another even more progressive method has been added. Commercially proven, it is the amazing process of sterilization by ultraviolet radiation, known as "Rentschlerizing."

The man directly responsible for this successful sanitization process is Dr. C. Rentschler, director of research of the Westinghouse Lamp Division. Five years ago, by means of an ultraviolet meter which he invented, he was able to measure accurately the amount of visible radiation of any selected wave length being emitted by his experimental ultraviolet lamps.

With this information, he patiently tested the effects of various ultraviolet wave-bands on bacteria. Assisted by Dr. Robert F. James, staff bacteriologist, Dr. Rentschler found a wave-band that appeared to annihilate germs within its range. This microbe death-ray he termed the 2537 Angstrom unit band. (An Angstrom is a very tiny unit of measurement, 1,300,000,000 of an inch.) Three-dimensional sterilization was thus made possible. Bacteria could be killed afloat in the air.

By combining mercury vapor and several other light-emitting gases, and by discovering an inexpensive kind of glass that would transmit this deadly Angstrom unit, he was able to introduce to the world the Sterilamp, produced at the Westinghouse Electric & Mfg. Co.'s Lamp Division, Bloomfield, N. J.

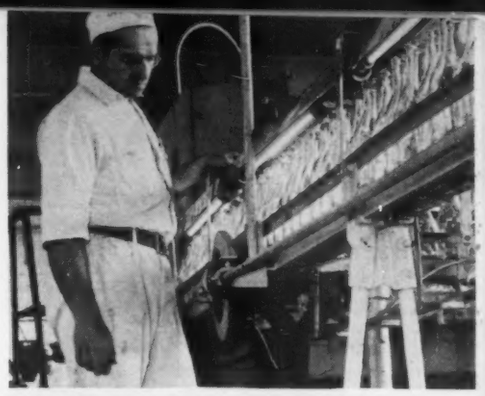
Countless experiments were then conducted in the laboratory dish with this long slender rod-shaped tube, whose length ranges from 30 to 34½ in., whose electrical energy requirement is the same as a 12-watt lamp. Successful tests were held in hotels, hospitals, restaurants, bakeries and dairies.

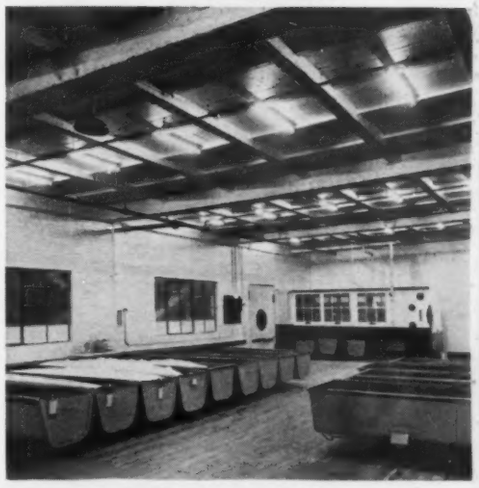
The new Sterilamp will save the meat industry thousands of dollars a year. Meat now is being kept from contamination at the higher temperatures and humidities most desirable and economical. Since all bacteria are virtually exploded into the air, mold and slime are impossibilities. Used in walk-in coolers and refrigerated show cases, Sterilamps keep meats more tender, more flavorable and reduce trimming and dehydration losses.

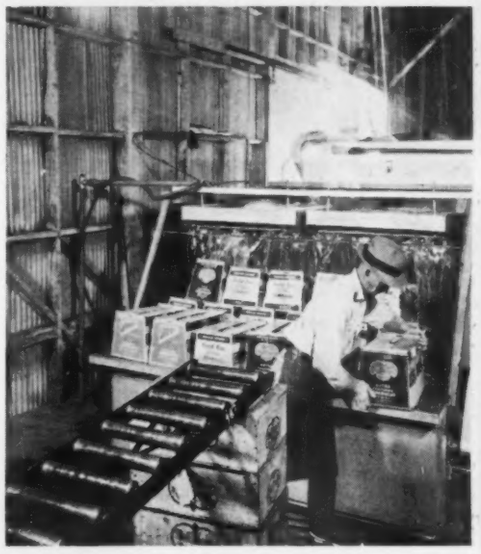
Fruit and vegetable packers and shippers are "Rentschlerizing" the air and water used in pre-cooling products prior to shipping. Frozen food and preserving plants are also finding invaluable uses for this process. In dairies, milk bottles are easily sterilized, while the air-borne bacteria in cow barns is considerably reduced.

Likewise in hospitals, where they are installed over operating tables, Sterilamps flood the area with germ-killing radiation. Vaccines, serums and cosmetics may be handled and packed in a sanitary atmosphere. Toilet seat sanitation, for many years stressed by medical authorities in their fight against venereal diseases, is now possible. Even the cool air of air-conditioning units may be sanitized. Household refrigerators, too, may be equipped with a small 6½ in. Sterilamp, which uses less than 2½ kw.-hr. a month, yet kills all bacteria and micro-organisms.

Now that the commercial application of the Sterilamp has been proven, it is though that the "Rentschler-James" process may eventually be used to control other air-borne diseases, such as infantile paralysis. With this startling but encouraging possibility in mind, human beings may well look forward to a healthier, happier design for living.







Sterilamps at work in various food industries—milk, baking, vegetable packing and meat. Located along ceilings or on equipment, these germ-killing tubes of light filter the surrounding air, promoting better health for everyone

Inspectors' Meeting

Fewer speakers, more code revision discussion, time to view Fair

Because of the importance of radical departures embodied in some of the proposed changes to the National Electrical Code, discussion of these changes, article by article, will be given the right of way at the Aug. 14-17 convention of electrical inspectors in San Francisco. Preliminary announcement of the program for the second joint meeting of the Northwestern and Southwestern Sections, International Assn. of Electrical Inspectors at Hotel Empire, San Francisco, made by Harold L. Gerber, secretary of the Southwestern Section, indicates that industry speakers will be few, article revision will get ample discussion time, and afternoons and evenings will be open for visits to Golden Gate International Exposition.

Registration and executive committee meetings of both sections, indeed, will begin Sunday night, Aug. 13. Monday morning session will be opened by Ben Hill, superintendent of the electrical department, Oakland, and chairman of the Northern California chapter. C. M. Kirsop, president of the Northwestern Section, Olympia, will preside. Welcoming addresses from Mayor Rossi of San Francisco and James M. Black, president of Pacific Gas and Electric Co., with a response by Carl Heise, Westinghouse Electric & Mfg. Co., San Francisco, member of the executive committee, will start the business session.

Morton G. Lloyd, Section of Safety Codes, National Bureau of Standards, Washington, D. C., president of IAEI; C. M. Kirsop, president of the Northwestern Section; W. J. Tretheway, chief inspector, Huntington Park, president of the Southwestern Section, will each give their presidential addresses. F. D. Weber, secretary-treasurer of the Northwestern, and Harold L. Gerber of the Southwestern Section will give their reports, followed by reports from the Utah, Puget Sound, Central California, Greater Central Valley, Imperial Valley, Southern California and Northern California chapters.

Luncheon with the San Francisco Electrical Development League, and a 49-mile scenic trip around San Francisco will complete the first day.

Tuesday begins with a code breakfast at 7:30 a.m. W. J. Tretheway will preside over the morning session. The single address that morning will be by A. R. Small, president of Underwriters Laboratories, Inc., and chairman of the Electrical Committee, National Fire Prevention Assn., code making body. He will discuss "Purposes and Activities of the Electrical Committee."

Reports will then be heard from article committees on articles 100 to 430. Procedure will be to hear the reports of any recommended changes from the article committees from each of the two sections, the clearing house committee recommendations, and the Electrical Committee article committee recommendation on the same subject. Only in this manner, in customary regular procedure, will the recommended changes to the National Electrical Code, made by the Edison Electric Institute be taken up.

Tuesday afternoon and evening are Electrical Inspectors' Day at the Fair.

Wednesday, too, will begin with a code breakfast. C. M. Kirsop will preside over the morning session, at which two industry speakers will be heard. W. J. Donald, managing director, National Electrical Manufacturers Assn., will speak on "NEMA Policies, Activities and Services and Their Significance to Electrical Inspectors." H. J. Morton, Detroit Edison Co., will present the engineering case for the proposed changes to the code suggested by the Edison Electric Institute. Remainder of the morning will be devoted to finishing article committee reports. A golf tournament in the afternoon, and the annual dinner dance in the evening, at Bal Tabarin, will close Wednesday with an all-industry social affair.

Thursday morning each section holds its own business session to elect officers and conduct its own business. That afternoon will be given to finishing the convention business, committee reports, etc. On Friday morning a joint meeting of the executive committees and clearing house committees of both sections will seek to crystallize previous discussion into definite code recommendations.

An exhibit of wiring materials, new electrical devices and materials will be held at the Empire Hotel. Entertainment and convention arrangements are being planned by a committee headed by C. W. Goodwin, General Electric Supply Corp., San Francisco.

WALTER STICKEL, of the Electrical Development League of Southern California, presented the adequate wiring story to a convention of house-building contractors in San Diego, May 17. He had previously presented the talk at a meeting of the Southern California Chapter of Electrical Inspectors in Long Beach.

Annual Elections

Western States electric clubs name new officers

ELEVEN new officers were unanimously elected at the June meeting of the Los Angeles Electric Club. C. H. Thrane, sales manager, General Electric Supply Corp., was named president, with W. E. Cranston, Jr., vice-president and general manager, Thermador Electrical Mfg. Co., as 1st vice-president and program chairman. The 2nd vice-presidency is filled by A. L. Stone, Stone Electric Supply Co., and the 3rd to H. W. Tice, assistant manager of operations, Southern California Edison Co. R. E. Fife, tax agent, Southern California Edison Co., was elected secretary-treasurer, and A. H. Howard, salesman, Tri-State Supply Co., sergeant-at-arms. The executive committee consists of M. G. Sues, L. J. Turley, G. A. Riley, J. H. Pengilly and D. T. Smith.

R. B. HOLLAND, York Ice Machinery Co., was elected president of the Air Conditioning Society of San Francisco at the May 25th meeting of the club. W. W. Cockins, Neal-Peterson Co., was named vice-president, with J. R. Hedge, P. G. and E., secretary- treasurer. These new officers, together with Ralph Folsom, Ames Co., retiring president, and Ray Plass, Harry Archer Co., retiring vice-president, form the Board of Directors.

ANNUAL ELECTION of officers of the San Francisco Pot & Kettle Club was held June 23, at the regular luncheon meeting in the Merchandise Mart. D. J. Bartelme was named president, with Phil Seagrave, 1st vice-president; Fred C. Wood, 2nd vice-president; L. W. Sauer, 3rd vice-president; George A. L'Amoreaux, corresponding secretary; W. H. Spaulding, recording secretary and Osgood Murdock, treasurer. Board of directors named were Earl M. Robitscher, chairman G. C. Gillan, R. L. Harkness, Bruno Kaufner, W. B. McDonald, A. R. Nisely, Frank Overbeck, Fred Sanford, M. Sweyd and Sidney Zobel. Elected members of an advisory board include E. W. Grinnell, F. B. Pearson and W. A. Traschel.

G. K. HASPEL was elected chairman of the AIEE, Vancouver section, for 1939-40 at its annual dinner in Hotel Georgia, Vancouver. Other officers elected were J. H. Steede, vice-chairman, and T. F. Hadwin, who will serve a second term as secretary.

Lethine Smith White Hixson Kerlen Bergeron West Noack Harper

NEWA Meeting

Pacific Division hold June convention at Del Monte

Intra-industry relationships as well as new business opportunities featured the summer meeting of the Pacific Division, NEWA, held at Del Monte, Calif., June 15-17. Reports of the Hot Springs meeting and discussions of local problems occupied the three executive sessions while speakers representing other branches of the industry were on the program at the two open meetings.

In an informal discussion of margins and net profits led by Harry Harper, Graybar Pacific Southwest manager, manufacturers and wholesalers present were polled as to their individual opinions of what constitutes a reasonable net profit, which a wholesaler ought to earn in handling a specific line. Manufacturer average was 5.6% with a range from 3 to 7.5%; wholesaler average was 4.9% with a range of from 3 to 8%. Point of Harper's discussion was that although wholesalers' operating costs had risen, margins had not.

The destructive effects of unrestricted and unwarranted price competition were outlined by George C. Tenney, editor of ELECTRICAL WEST, in a discussion entitled "War Is Hell." Prevalence of price wars in an industry, he declared, was a tacit admission of inability to sell constructively and creatively and of lack of business statesmanship. M. C. Hixson, San Francisco manager of the G-E Incandescent Lamp Department, described the electrical features of the New York Fair.

Opportunities in school lighting were presented by Leonard Hobbs, Smoot-Hollman Co., who outlined the results of a survey of school lighting recently conducted by the San Francisco section of the I.E.S. Despite the fact that 87% of knowledge of school children is obtained visually, the survey showed that less than 1% of the educational budget is spent for adequate lighting. F. T. Letchfield, consulting engineer of the Wells Fargo Bank & Union Trust Co., San Francisco, gave a masterful address on "An Engineer Looks at America" in which he discussed economic trends and future industrial possibilities. These two program features were presented by the Ben Franklin Electric Club of Northern California.

In the regular golf tournament the historic Cooper Cup was won by C. W. Goodwin, San Francisco district manager, G-E Supply Corp. The Clendenen Cup was won by A. T. Bergeron, Miller Co. and the Manufacturers' Cup by George West, Pacific Coast manager G-E merchandise department.

Agenda

Western electrical men gather in various associations

From Southern California to Vancouver, British Columbia, electrical men are meeting to discuss their industry. Here are a few club activities:

ELECTRICAL MAINTENANCE ENGINEERS ASSN., Los Angeles—Next regular meeting is set for July 20, at Royal Palms Hotel. Industrial applications will be discussed at this "Transformer Night." The 3rd Annual Stag, June 16, was attended by 350 men. Plans for the coming fall season have been made, with "Gadget Night" scheduled for September 19. Members are invited to display any type of electrical gadget of their own design used in plant operation.

Electrical League of Utah—Held three meetings in May at Salt Lake City, Ogden and Provo, for the purpose of adequate wiring promotion. Speaker was A. E. Schanuel, NA WB. Three more adequate wiring meetings were held in June with Elias J. Strong and J. Hyde Stayner, speakers.

National Electrical Contractors' Assn., Los Angeles Chapter—Met May 8, Clark Hotel, May 22 and June 12 at Hayward Hotel for regular semi-monthly meetings. Two more are scheduled for July 10 and August 14. Association business is to be discussed.

Santa Barbara Chapter, NECA—Met May 11 and June 8 for business meetings, and May 25 and June 22 for dinner meetings. July get together dates are set for July 13 and 27.

Victoria Electrical Assn.—A. Whiteman, Oak Bay Electric, Oak Bay, was recently elected president of the association, having served as vice-president for the past year. He succeeds R. T. Murphy, Murphy Electric. E. Emery, Emery Electric, Victoria, is the new vice-president, while A. R. Colby, Colby Electric, Victoria, has been re-appointed for his sixth successive term as secretary treasurer. Members of the executive are: Murphy, J. Langdon, E. Cox and E. Mainwaring. The association meets the second Tuesday of each month, and has been actively engaged in carrying on educational work within the trade in Victoria.

Vancouver Electrical Assn.—J. Homersham was elected president of the association at the annual meeting held in Vancouver, preceding the annual dinner at the Hotel Georgia. He has served as a member of the executive of the association and last year as vice-president. Earle Dunsmuir, Dunsmuir Electric, has been named vice-president. G. W. Firth, formerly editor of The Electric Eye, official association organ, will act as treasurer. S. F. Ricketts, secretary. W. C. Mainwaring, general sales manager of the B. C. Electric Railway Co., H. D. Wilson, Thomas Martin, city electrician and R. Hall, secretary Electrical Service League of B. C., were speakers.

AN INFORMAL Western Radio and Appliance Trade Dinner was held June 28, in the Mart Club dining room in San Francisco. A. F. Rice, manager of market development, Southern California Gas Co., presented some interesting sales slants in his talk, "New Appliances Present New Opportunities." Rice was followed by Thomas F. Joyce, vice-president and director of advertising, RCA Mfg. Co., Camden N. J., who addressed the group on "Television and the Future of the Radio Dealer." Alfred H. Meyer, president of the Pacific Appliance Institute and the Leo J. Meyberg Co., San Francisco, served as general chairman of the event. Benny Walker, famous radio maestro, acted as master of ceremonies.

ELECTRICAL INDUSTRY DAY at the San Francisco Golden Gate International Exposition is being developed by a committee of representatives from various branches of the electrical industry, headed by Carl Severin, president of the San Francisco Electrical Contractors Assn. Tentative date has been set for Sept. 16. The exact purpose of the Industry Day will be that of attracting to the Fair the families and employees of all types of companies operating in the electrical industry, including the contractors, electrical dealers, wholesalers, manufacturers, radio dealers, utilities, telephone and telegraph companies, the Electric Appliance Society, Electrical Development League, the IBEW, and others. Details of the program for the day has yet to be arranged.

ELECTRICAL WEST

The All-Industry Magazine of Progress

Established 1887 and Incorporating the "Electrical Journal," "Journal of Electricity, Power & Gas" and "Journal of Electricity"

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A Poor Excuse

BANDIED about without any official confirmation or denial is a report that the next step in the Federal power program will be a proposal for the construction of a transmission grid blanketing the far Western states and connecting all of the existing public power projects. Rumor has it that such a transmission network will be justified by the argument that it is vital in the interests of national defense.

To any one familiar with the power situation in this region the proposal sounds absurd. In the first place there is no present or potential power shortage in any section of the West. Secondly, the major power-using areas are already interconnected through existing lines. If these interconnections are not sufficiently adequate, it would be a simple matter to increase their capacity. And finally, any new network would be an uneconomical duplication of facilities which now serve the area.

There has been too much of such duplication of facilities already. In the Northwest the Bonneville administration has embarked upon a line construction program which will ultimately cost $100,000,000. Practically all of these lines duplicate the existing transmission systems. Had the private utilities been given the responsibility for marketing Bonneville power, the building of a few needed tie lines at an estimated cost of $8,000,000 would have provided sufficient line capacity to distribute 250,000 kw., or all of the power that will be produced by the ultimate Bonneville installation.

The same holds true for other sections of the region. The private companies have the resources, the man power and the skill to distribute and market the federally-produced power. They also can take care of any requirements for national defense.

Wise Chinaman

AS THOUGH it had been written for today, Lao-Tze, Chinese scholar wrote this editorial for us 560 years before Christ:

"As restrictions and prohibitions are multiplied in the Empire, the people grow poorer and poorer. When the people are subjected to overmuch government, the land is thrown into confusion. When the people are skilled in many cunning arts, strange are the objects of luxury that appear.

"The greater the number of laws and enactments, the more thieves and robbers there will be. Therefore the sage says: 'So long as I do nothing, the people will work out their own reformation. So long as I love calm, the people will right themselves. If only I keep from meddling, the people will grow rich. If only I am free from desire, the people will come naturally back to simplicity.'

"If the government is sluggish and tolerant, the people will be honest and free from guile. If the government is prying and meddling, there will be constant infraction of the law. Is the government corrupt? Then righteousness becomes rare and goodness becomes strange. Verily mankind has been under delusion for many a day! Govern a great nation as you would cook a small fish—that is, don't overdo it."

A Pattern for REA

IN SPECULATING on the ultimate outcome of the Federal rural electrification program one cannot help but compare the extravagance, the haphazardness and the misconceptions of some of the REA activities with the purposefulness and accomplishments of the various state Committees on the Relation of Electricity to Agriculture. These latter organizations have functioned from the beginning on the philosophy that electricity's contributions to agriculture must be economic. Their studies and recommendations have been based on the fundamental principle that any rural electrical application should increase the farmer's production, decrease his costs, give his products a su-

perior competitive position in the market or improve the overall efficiency of any farming operation.

The history of the California CREA is a concrete example of the application of this philosophy. That body was organized in 1924. In the intervening 14 years it has been financed by contributions from the industry aggregating $100,000. In addition the Agricultural Experiment Station and the University of California have supplied approximately $150,000, largely in manpower and equipment. When the committee began its work mechanical refrigeration in dairies was unheard of; electric brooding was purely experimental; there was no electric soil heating. Hydroponics was just a dream. These things and many more have become definitely accepted farm practices. Included have been sprinkler irrigation on a widespread scale, insect control by light, farm refrigeration, air conditioning of farm homes, and air conditioning for plant and animal production. Many of these investigations required courage, imagination and foresight to carry them through. All have contributed immeasurably to the improved economic status of the farmer and to the growth and profits of the electrical industry.

In all of the hue and cry over REA, such accomplishments and contributions as have come from the various CREA'S may be forgotten or overlooked. Yet if REA is ultimately successful, no small part of its success will be due to the pioneering work which these committees have done.

A Plea for Fewer Models

HOW TO EARN a net profit is one of the great problems confronting the entire electrical appliance field today. The manufacturer, the distributor and the retailer all face it. Each, to a degree, blames the other for his inability to make money. Yet, as our contemporary, *Electrical Merchandising*, puts it, the fault may lie with the merchandise and not with the methods of doing business.

Examination of the major appliance field reveals a fact that has considerable bearing on the subject of profit. It is the multiplicity of models of refrigerators, ranges, water heaters and washers which the manufacturers produce. These range from twelve to twenty in the case of refrigerators to as high as 800 in the case of water heaters.

It is axiomatic that a reduction in the number of models would materially reduce the cost of merchandising all down the line. The manufacturer would require fewer expensive tools and dies, his inventory would be smaller and his sales costs less. The distributor would have a smaller inventory and also lower sales costs. And the same would apply to the dealer. Eliminated too would be the serious problem of mark downs which disrupt markets, destroy values and confuse the customer. The refrigerator experiences of 1938 are still fresh in the minds of everyone in the industry. The trade wants no more cases like that.

One sure way to solve this problem is through the reduction in the number of models of all major appliances. The benefits to be derived from such a program are such that a serious effort to achieve such simplification is warranted. Certainly shorter lines will mean longer margins for everyone. And this in turn will assure more net profits.

In Contracting Too

"WHO says the government isn't in the electrical contractor's business?" a contractor in a Western city asked not long ago. Then he went into detail.

The public works department in his city bids on street lighting and on the wiring and remodeling of electrical equipment in city buildings. And because this city department does not charge itself proper overhead, it takes the work below cost.

Schools in his town have a maintenance department that does all the electrical maintenance work and a considerable amount of new work as additions are needed. The city and county hospital does likewise. And with a trade discount on lighting materials, lamps, and wiring supplies, much of this business that used to go through the electrical contractor, and enable him to pay taxes in support of the schools and city and county government, now by-passes him.

In this contractor's town the Army and Navy and Marine Corps all have large establishments, and once upon a time he enjoyed business from them in the repair and rewinding of motors, maintenance of electrical equipment and in making small or large installations of new equipment. Not so any more. They have their own maintenance departments and even rewind motors now.

Time was when the other branches of the industry smiled and raised their eyebrows when a utility man suggested that government would some day invade their fields just as it had entered into the light and power business. But times have changed as this contractor can testify. Nor is his the only branch of the industry to face such competition. Cooperatives are being organized with government sanction and support which by-pass both the wholesaler and the retailer. Not long ago the REA announced that it would purchase in bulk and supply projects with equipment and supplies at cost.

To those skeptics who believed that, like the title of Lewis' book, "It Can't Happen Here," there is one answer: "Here it is."

Pump Testing

Data presented on pictorial form wins farmer's applause

By C. H. EDMAN
San Joaquin Power Division,
Pacific Gas and Electric Co.

ONE of the most highly appreciated services performed by the power company for the farmer is periodic pump testing to insure economical overall pumping plant operation. It is a service which reduces complaints over high power costs and at the same time assures the farmer that he is getting the maximum service from the electrical energy he purchases.

In many instances the results of a pump test are given to the rural specialist in tabulated form for presentation to the farmer. Although these forms are clearly understood by the rural power salesman, they are frequently baffling to the farmer. Experience shows that if the data contained in the report can be transferred to a simple chart, the farmer can grasp its significance and appreciate whatever recommended changes may be necessary.

After several trials the writer has worked out a chart which clearly and simply presents the data on the test of any pumping installation. This pictorial representation can easily be worked out from ledger and pump test data. An analysis of the account appears in the upper section. The first column contains the ledger data. The second is worked out from these data and the test record. The last column is usually calculated in the presence of the farmer when the test results are delivered to him.

Experience shows that this type of presentation wins goodwill and is better understood.

U. C. defines scope of pump testing laboratory

Because of some misunderstandings, the scope of the pump testing laboratory operated by the University of California on the Berkeley campus has been defined in a technical memorandum issued by Prof. M. P. O'Brien, chairman of the Department of Mechanical Engineering. The laboratory was established in 1937 by the M. E. Department in cooperation with the Agricultural Engineering and Irrigation Investigations and Practice divisions to provide basic information for both manufacturer and purchaser.

In order to avoid any charge of partiality, all tests of deep-well and propeller pumps are made without charge up to the limits of test facilities and assistance. The test results are confidential and are released with identification only to the manufacturer or owner of any unit. Results of tests without identification can be examined by qualified engineers. The staff of the laboratory including Professors R. G. Folsom and M. P. O'Brien, do not act in a consulting capacity to any pump manufacturers.

The experimental program now in progress at the laboratory includes:

1.—The normal characteristics of deep-well turbine pumps including power input, head, capacity, thrust and efficiency. Vertical shaft propeller pumps are included.

2.—Dynamometer performance tests on vertical shaft electric motors.

3.—Effect of clearance on performance of open and closed impellers.

4.—Hydraulic friction losses in discharge elbows.

5.—Development of equipment to study direction and magnitudes of velocities in propeller pumps.

6.—Characteristics of pumps operated as turbines.

7.—Characteristics of dredge pumps.

8.—Characteristics of centrifugal pumps with viscous fluids.

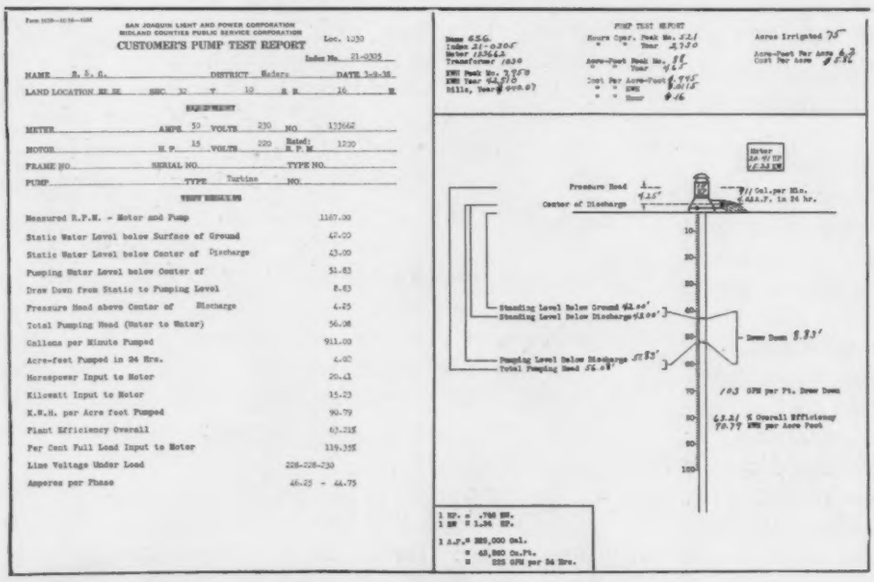
9.—Friction losses in angular contact thrust bearings.

10.—Methods of capacity measurement.

11.—Pump performance with cut impellers.

Installed transformer capacity at the laboratory is 110 kva. although line capacity is available for 280 kva. A total of 88 kva. at 440 volts, or 44 kva. at 220 volts is available at the test stand for a.c. testing and 50 kw. at both 220 and 110 volts for d.c. machine testing. Elaborate hydraulic facilities have been provided for water measurements.

Customary tabular form in which pump test data are presented to the farmer (left) and simplified pictorial form which incorporates test and ledger data in a more understandable manner (right)



SAN JOAQUIN LIGHT AND POWER CORPORATION
MIDLAND COUNTIES PUBLIC SERVICE CORPORATION

CUSTOMER'S PUMP TEST REPORT

Loc. 1030
Index No. 21-0305

NAME S. S. G. DISTRICT Madera DATE 3-8-38
LAND LOCATION SE SE SEC. 32 T. 10 S R. 16 E.

EQUIPMENT

METER AMPS. 50 VOLTS 230 NO. 137662
MOTOR H. P. 15 VOLTS 220 Rated: R. P. M. 1230
FRAME NO. SERIAL NO. TYPE NO.
PUMP TYPE Turbine NO.

TEST RESULTS

Measured R.P.M. - Motor and Pump	1167.30
Static Water Level below Surface of Ground	47.00
Static Water Level below Center of Discharge	43.00
Pumping Water Level below Center of	51.83
Draw Down from Static to Pumping Level	8.83
Pressure Head above Center of Discharge	4.25
Total Pumping Head (Water to Water)	56.08
Gallons per Minute Pumped	911.00
Acre-feet Pumped in 24 Hrs.	4.02
Horsepower Input to Motor	20.41
Kilowatt Input to Motor	15.23
K.W.H. per Acre foot Pumped	90.79
Plant Efficiency Overall	63.21%
Per Cent Full Load Input to Motor	139.35%
Line Voltage Under Load	228-228-230
Amperes per Phase	46.25 - 44.75

PUMP TEST REPORT

Name S.S.G.
Index 21-0305
Meter 135623
Transformer 1030

Hours Oper. Peak No. 521
" " Year 4,730

Acres Irrigated 75

KWH Peak No. 3,879
KWH Year 44,910
Bills, Year $ 900.07

Acre-Feet Peak No. 15
" " Year 91.5

Acre-Feet Per Acre 4.2

Cost Per Acre-Foot $.795
" " KWH $.0215
" " Hour $.46

Cost Per Acre $ 3.34

Meter 22.91 KW 17.24 KVA

Pressure Head 4.25'
Center of Discharge

911 Gal. per Min.
4.02 A.F. in 24 hr.

Standing Level Below Ground 47.00'
Standing Level Below Discharge 43.00'

Pumping Level Below Discharge 51.83'
Total Pumping Head 56.08'

Draw Down 8.83'

10
20
30
40
50
60
70
80
90
100

103 GPM per Ft. Draw Down

63.21% Overall Efficiency
70.77 KWH per Acre Foot

1 H.P. = .746 KW.
1 KW = 1.34 H.P.

1 A.F. = 325,000 Gal.
= 43,560 Cu.Ft.
= 225 GPM per 24 Hrs.

Egg Cooling

Evaporative type cooler has new farm application

Hot arid summer weather prevailing over large sections of the West rapidly reduces the initial quality of fresh laid eggs. It has been found that a cooled and fairly humid room in which to keep eggs between shipments to market is of dollars and cents value to the poultryman in preventing deterioration due to heat and dryness.

Successful tests have been made with rooms equipped with evaporative type or "Arizona" cooler for handling and storing eggs on the farm and the practice is now being generally recommended. The University of California Division of Agricultural Engineering recommends a room 10 by 12 ft. with a 7-ft. ceiling. Air tight floors are essential and unless the room is constructed inside another building, the ceiling should be insulated with rock wool, shredded redwood bark or rice hull ashes. Insulating wall board should also be used on the side walls.

Cooler capacity should be 125 cu. ft. per min. which can be secured with a 16-in. fan rated at 1,750 r.p.m. At least 3 in. of excelsior is necessary in the pad. The room requires a screened vent for exhausting the air.

RURAL LOADBUILDING

A New, Inexpensive Addition to the Popular Kearney Line—

the Hi-TENSION STEEL TWO WAY EXPANSION ANCHORS

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO.

"The Mark of Quality Products"

Now—build greater security and safety into your lines—inexpensively—with these new Kearney (Armco Steel) Expansion Anchors . . . Get maximum holding power, too, because these anchors, like the other 2-way expansion anchors of the popular Kearney line, are similarly designed with blades that expand up to 2½ times their rated size and have as much as 63% of the blade area in firm, undisturbed earth.

And they are easy to install: special contour of the blades exert an outward as well as upward force—they expand through their original arc—thus preventing wedging effect and assuring proper expansion with minimum effort.

Kearney Hi-Tension Steel Anchors incorporate the advantages of special design for installation ease and holding power; strong: made of Armco Steel; lighter weight and—inexpensive.

You really should try this anchor—make rigid tests and prove to yourself that all of the things you want in an inexpensive anchor are built into this one . . . Ask a Kearney Representative or—write today for new low prices and detailed information.

Kearney Engineers, in cooperation with Field Engineers, have designed these steel anchors in four 8-inch sizes—with expanded blade areas of 90", 110", 125" and 136".

Exclusive Sales Representatives

MAYDWELL & HARTZELL
INCORPORATED
LOS ANGELES ▼ SAN FRANCISCO
PORTLAND

Exclusive Distributors

GRAYBAR ELECTRIC CO.
SEATTLE, PORTLAND, TACOMA, SPOKANE

WESTINGHOUSE ELECTRIC SUPPLY COMPANY
PHOENIX

J. R. BRADLEY COMPANY
RENO

For Better Maintenance and Construction—

Use KEARNEY PRODUCTS

NEWS OF THE INDUSTRY

BONNEVILLE POWER POLICIES FAVOR PUD INDEPENDENCE

With revised contract forms for Bonneville power sales to public districts, utilities and industries completed, Acting Administrator F. A. Banks returned to Washington to discuss their terms with the Secretary of the Interior and the National Power Policy Committee.

The Bonneville chief recently expressed the opinion at the annual meeting of the Washington Utility District Commissioners' Assn. that major questions of policy will be settled quickly, so that uniform contracts will be available to all districts.

Power from Bonneville Dam will be ready for delivery on the Bonneville-Vancouver and Portland-Eugene transmission lines this coming November, Banks disclosed. Bids were to be opened in June for construction of the 220,000 volt system to connect with Grand Coulee dam. Construction of that line and the circuit to Kelso and Raymond will be completed by June, 1940. The latter line will serve public interests in Clark, Cowlitz, Lewis, Grays Harbor, Pacific and Wahkiakum Counties.

A large part of the 1940 appropriation will be spent to construct Bonneville substations to serve the districts and utilities along the Washington and Oregon lines.

Administrator Banks clearly indicated that each dsitrict must determine for itself how it will acquire its distribution system. "Insofar as it is humanly possible to settle any question by arbitration and negotiation," he said, "it is up to the people to decide how they want to buy Bonneville power. There does, however, come a time when one or both parties may be obstinate and no progress can be made. Then the law of the land has provided a means of deciding the question. The districts have been given the power of eminent domain to acquire the power lines they need by condemnation," he declared.

Members of the Grange asked Banks what aid they could expect in the formation of public power districts. "We are willing to give you whatever assistance we can under the Bonneville law," he assured them. "We shall be glad to provide whatever information is available, and assist you in interpreting it, but I don't think we should take the position of going out and campaigning for formation of districts. That should spring from the district itself," he concluded.

A Smile In Every Home!

Many Oriental cities have enjoyed the benefits of electricity for years, but electric light is still regarded with awe in most of the smaller Asiatic settlements. As evidence, the following advertisement is quoted. This copy appeared in the MANDALAY SPECTATOR, a Burma newspaper—

"You want electric light. Newest invention. All who wish to enjoy luxuries of modern city life in their smiling homes may purchase one. May be used on table or wall. You may light or blow it off lying in bed at any time by using the other end of the string that passes to your pillow. Very pleasing to reading, and glorifies the room or hall with splendid light as if sun has come down to your smiling house. Burns in strong wind. If placed in public functions, crowds will gather to it."

Courtesy Idaho Power Co. Bulletin

SOUTHERN CAL EDISON WINS NATIONAL AD PRIZE

Newspaper advertising of the Southern California Edison Co., Ltd., has been awarded national honors in the annual Better Copy Contest of the Public Utilities Advertising Assn. The Southern California organization won the award of merit for public relations newspaper advertising and the premier award for merchandise newspaper advertising for electric companies in the 1938 competition with several hundred other utilities.

R. G. Kenyon, advertising manager of the Southern California Edison Co., Ltd., received the two certificates of award for his company at the annual convention of the association in New York City, June 21. The company's newspaper advertising, selected from 4,000 entries in the nationwide contest, was exhibited as one of the features of the convention.

WASHINGTON COUNTIES KEEP STATE COURT HUMMING

The Supreme Court has affirmed a Whatcom County Superior Court judgment in a case by which Public Utility District No. 1 proposed to levy a 2-mill tax upon all property within the county to acquire public utilities. The lower court held that property within the cities of Blaine and Sumas cannot be taxed by the district for the purpose of establishing, acquiring or operating electrical distribution systems, and that Blaine is not included in the district for the purpose of establishing a water system and cannot be taxed for that purpose. The court further held the district could lexy taxes on property within the two cities for purposes mentioned in the district's budgets for 1938-39, except for items for the primary purpose of acquiring an electrical distribution system.

Exemption of property within a municipal corporation, which already operates a public utility from taxes levied, to pay for establishment of a utility of like character by another municipal corporation, is a reasonable classification, and applies to all municipalities similarly situated, the high court declared.

Lewis County Successful

In Lewis County, the Public Utility District was successful in Federal Court in Tacoma in establishing public use and necessity in the matter of its condemnation proceedings against the Washington Gas & Electric Co. to obtain an electric power plant at Morton. Judge E. E. Chusman issued the decrees of public use and necessity and announced that on July 10, he would set the trial date. While the Douglas County PUD petitioned the Federal Court for a decree, adjudging acquisition by it of Puget Sound Power & Light Co. properties in central Washington to be in the interest of public convenience and necessity.

Model Light & Power Denied

The Washington State Supreme Court recently denied a petition for rehearing in the case of the Model Light & Water Co., of Spokane County, against the Washington Water Power Co. The smaller company had brought suit against the larger utility, contending rates were discriminatory and higher than those charged other similar companies. The Supreme Court rejected

Hotpoint Water Heaters Offer More in Every Way

because...

1 Only Hotpoint has Calrod, the *sealed* electric unit of great speed and long life.

2 Only Hotpoint gives you public acceptance backed by 30 years of national advertising.

3 Only Hotpoint offers you the chance to *sell* more water heaters because *more people buy* Hotpoint than any other make.

4 Hotpoint's research staff continues to seek improvements that render greater service to customers.

5 Hotpoint is dedicated to the policy of "not the cheapest, but the biggest dollar value."

6 Hotpoint believes that by giving the fellow on the "other side of the meter" a reliable, quality product, the combined interests of utility, retailer and user are best served.

7 Hotpoint is the world's largest manufacturer of Electric Water Heaters—produces the most complete line in square and round models.

8 Hotpoint Leads in Product Value—In sales helps that *sell;* in consumer acceptance; and most important to *you* Hotpoint leads in sales. You can *build* with Hotpoint.

EDISON GENERAL ELECTRIC APPLIANCE CO., Inc., 5612 West Taylor St., Chicago, Illinois

Hotpoint

ELECTRIC WATER HEATERS

IT MUST BE RIGHT

smooth sailing with TRIANGLE

TRIANGLE PRODUCTS GO PLACES

Mr. Contractor!

Deeds! Not words! *That's Triangle!*

Sure, everybody talks Quality but the best evidence of quality is the selection of *Triangle* conduit and wire for this and similar outstanding installations!

Mark your orders: *"Must Be Triangle!!!"*

TRIANGLE PRODUCTS REWARD BUYERS!

TRIANGLE CONDUIT & CABLE COMPANY, INC.

Horace Harding and Queens Blvds.
Elmhurst, New York City, N. Y.

Pacific Coast Division: C. C. Hillis, Vice-President in Charge of Sales, 390 Seventh St., San Francisco, California

this contention in its decision and refused to hear the case.

Lewis, Cowlitz Counties Join

County commissioners of Lewis and Cowlitz Counties in Washington have adopted resolutions announcing their intention to join with State public utility districts and the Washington State Grange in a complaint against the Puget Sound Power & Light Co. The complaint, it is stated, will be filed with the State Department of Public Service as soon as commissioners of four other counties take similar action. Attorney Jack R. Cluck, counsel for the PUDs, said oral approval had been given by the commissioners of Douglas, Chelan, Kittitas and Whatcom Counties.

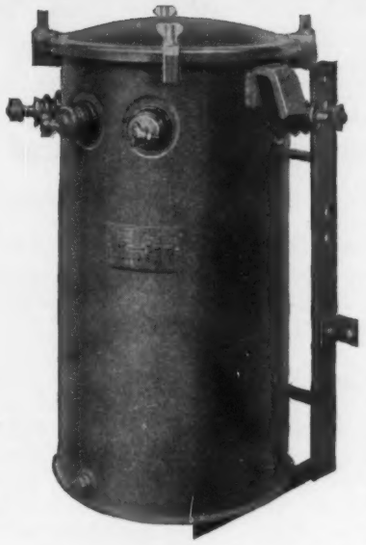
The complaint, Cluck stated, will ask the Department of Public Service to compel the Puget Sound Power & Light Co. to file a rate schedule for wholesale electric service to the utility districts; to set aside the company's rural electrification service schedule as "excessive and discriminatory" and to order the company to grant access to its books and records.

According to Ervin E. King, Master of the Grange, "The Washington State Grange is joining in the complaint as a friend of the districts because the Grange takes the position the districts should have access to the company's books and records so they can pay the company a fair price for its properties."

SUIT SEEKING to enjoin purchase of the Grays Harbor Railway and Light Co. by the Grays Harbor Public Utility District, Aberdeen, Wash., and to outlaw a contract between the district and Guy C. Myers, Wall street broker, for sale of district revenue bonds, was filed in Aberdeen recently by John Bayha, Aberdeen. Bayha's attorney said the suit was filed because the Myers bond contract was "against public policy".

THE FEDERAL POWER COMMISSION has consented to withhold action for six months on the application of the state of Arizona for a preliminary permit for the proposed Bridge Canyon project. Made at the request of the Committee of Fourteen, Colorado River Basin States, this is to allow ample time for a study to be made of the proposed project by all interested parties. The proposed project is for a 1,100,000 h. p. hydroelectric development on the Colorado River in Mohave and Coconino Counties, Arizona, approximately 80 mi. upstream in a direct line from Hoover Dam.

Plain Hoss Sense
+ good basic quality
+ up-to-date design
= SUPERIOR
REG. U. S. PAT. OFF.
★ ★ PRODUCTS
THE SUPERIOR SWITCHBOARD & DEVICES CO.
CANTON, OHIO
★ Manufacturing ★
METER & RELAY TEST SWITCHES
METER & TRANSFORMER ENCLOSURES
METER TEST BLOCKS & TABLES



Wagner 15 kva., 2400 to 120/240 volt, 60 cycle, single-phase, type HEB stud-bushing-type transformer. It has coordinated bushings and insulation and is self-protecting against lightning, and, therefore, inherently a surge protected transformer.

Wagner
DISTRIBUTION TRANSFORMERS

STUD BUSHING TYPE—With bushings through tank wall.

STUD BUSHING TYPE—High voltage bushings through cover, low voltage bushing through tank wall.

POCKET LEAD TYPE—

RURAL LINE—High voltage bushing through cover, low voltage bushing through tank wall.

SURGE-PROTECTED — Stud-type equipped with arrester or gaps.

Wagner distribution transformers are modern in design and construction, and conform to the latest standards. They embody such features as: (1) carefully selected, pre-tested materials, (2) low electrical losses, (3) good regulation, (4) adequate safety features, and (5) details that make them easy to install and maintain. They are completely described and illustrated in Bulletin No. 180, a copy of which will be sent you upon request. Write today for your copy. T39-3

Specify Wagner Transformers in Your Request

Wagner Electric Corporation
6400 Plymouth Avenue, Saint Louis, Mo., U.S.A.
TRANSFORMERS MOTORS FANS BRAKES

Hood River Votes Against PUD Formation

Hood River County, Ore., was divided in the first Public Utility District vote since the revamping of the Oregon PUD law early this year. The town of Hood River voted against the formation of the district, 555 to 385. Outside the town in 11 voting precincts containing most of the county's rural population, which had been combined into three precincts for this election, the vote was 922 in favor of forming a district to 685 against.

The fact that the city voted itself out of the district leaves some doubt as to whether the outside precincts may form a district without the town. Some legal opinion contends that a PUD without the town is not the proposition originally voted upon, and that, consequently, the district proposal fails when any part excludes itself.

The vote, 60% of the total possible, was the largest ever cast in a special election in the County.

Hoover Dam Power Bills Introduced in House

Representative James G. Scrugham, (D., Nev.) last month introduced two bills revising rates for Hoover Dam power. These bills carried into effect an agreement arrived at by a committee representing the seven Colorado River basin states.

The legislation has been approved by representatives and power experts from each of the seven subscriber states and little opposition is expected when hearings are held before the House Committee on Irrigation and Reclamation.

Declaring that it has been recognized for some time that rates for electric energy fixed for Hoover Dam in 1930 are "out of line with present conditions, particularly with other Federal power projects," Scrugham described the legislation as representing an agreement between all interested parties.

The two bills provide for a reduction from 4% to 3% in interest rate during the 50-year amortization period which has the effect of lowering the cost of firm power from 1.63 mills per kw.-hr. to an estimated 1.10 mills per kw.-hr.; for a bond issue to amortize the government's investment in the power plant; for the allocation to Arizona and Nevada a fixed sum of $300,000 each per year, in lieu of taxes.

They also take care of a separate fund of $500,000 annually to be used for Colorado River development, with the upper portion of the Basin receiving the benefit of the payments during the early years of the program and the entire Basin participating therein after the year 1950. Payment of the $25,000,000 flood control allocation beyond the 50-year period is to be deferred.

California Assembly Defeats Revenue Bonds Assistance Bill

Legislation designed to permit the California Water Authority to issue $170,000,000 of revenue bonds to assist cities and other political subdivisions to undertake municipal power distribution, was defeated 39 to 35 by the California Assembly during the closing hours of a hectic session of the legislature. The bill had previously passed the conservative state Senate. It had the full support of the Olson administration as well as municipal ownership advocates.

Stated purpose of the measure was to permit municipalities, counties and utility districts to receive state financing aid in contracting for and distributing power from the Central Valley Project. Opponents claimed that it was a subterfuge to circumvent restrictions placed on revenue bonds by California voters when they overwhelmingly turned down a revenue bond proposal in the last general election. A similar measure had already been voted down by the California legislature this year.

P. G. and E. Exact Rate Reduction Figures Announced

Exact rate reduction, affecting every domestic and commercial electric customer served by P. G. and E., has been announced by the California Railroad Commission. Effective, July 1, these annual savings will amount to $2,200,000.

Customers will enjoy annual reductions over the new system as follows: domestic, $723,000; commercial, $903,000; street lighting, $111,000. Those in congested areas adjacent to incorporated cities will save $250,000 beginning Aug. 1, while miscellaneous reductions total $25,000.

In the larger communities around San Francisco Bay area, domestic reductions are in the first 35 kw.-hr.—from 3.6c to 3.3c. In San Francisco, for example, energy costs under domestic schedules, as compared with 1920, are:

Monthly kw.-hr.	1939	1920
20	$1.06	$1.84
35	$1.56	$3.22
50	$1.89	$4.60
100	$2.99	$8.05

Calif. Railroad Commission Approves Utilities Compromise

Approval of the California Railroad Commission has been granted to a compromise agreement between Southern California Edison Co. and the Los Angeles Bureau of Power & Light, covering the transfer of properties located inside and outside the Los Angeles city limits. The negotiations terminate many years of litigation.

Under its terms the Bureau of Power & Light pays $5,572,000 for 48 parcels of Edison distribution facilities in areas annexed to the city since 1922. In the exchange the Edison company receives certain scattered facilities outside the city limits which the Bureau acquired when it purchased the system of the Los Angeles Gas & Electric Corp. These properties have a value of $1,078,000. Approximately 50,000 former Edison customers will go over to the Bureau lines and 8,500 Bureau customers will now be served by the Edison company.

The negotiations were conducted by Harry J. Bauer, Edison president, and F. D. Howell, member of the Los Angeles Board of Water & Power Commissioners.

Bureau of Reclamation 1939 Appropriations Announced

Appropriations for construction by the Bureau of Reclamation for the fiscal year, commencing July 1, total $65,223,000. The Interior Department Appropriation Act and the Third Deficiency Act contain the following Western states items: Arizona, Gila project, $700,000; Parker Dam power project, $4,000,000. California, Central Valley project, $10,000,000. Colorado, Colorado-Big Thompson project, $1,500,000; Paonia project, $300,000; Pine River project, $1,000,000.

Idaho, Boise-Payette project, $500,000; Minidoka project, $100,000. New Mexico, Carlsbad project, $100,000; Tucumcari project, $250,000; Elephant Butte power project, $483,000. Oregon, Deschutes project, $400,000; Owyhee project, $270,000. Utah, Provo River project, $1,350,000. Washington, Grand Coulee Dam project, $23,000,000; Yakima-Roz project, $900,000. Wyoming, Kendrick project, $925,000, Riverton project, $100,000; Shoshone project, $495,000.

Of these, two new projects are provided for in Parker Dam in Arizona-California and the Paonia project in Colorado. The Hoover Dam project was awarded $4,000,000 and the All-American canal project, $2,000,000.

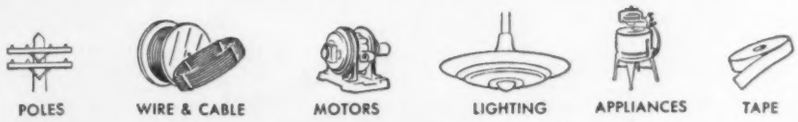
We serve

the whole community

THE hustling center of business downtown... busy factories along the railroad ... cozy homes on the outskirts ... *the whole community* ... is served by Graybar's distribution of electrical supplies.

Pole lines to carry electric light and power over the countryside ... street lights and Public Safety equipment for the city ... motors for industry ... appliances for the home ... and wiring materials for every building or maintenance need ... all these are made readily available from Graybar.

Graybar's list of 60,000 electrical items amply meets *every* electrical need. Graybar's system of nearby warehouses brings you *what* you want ... *where* you want it ... *when* you want it. And Graybar's reputation since 1869 is your assurance of reliability.



Distributed and guaranteed by GraybaR ELECTRIC COMPANY

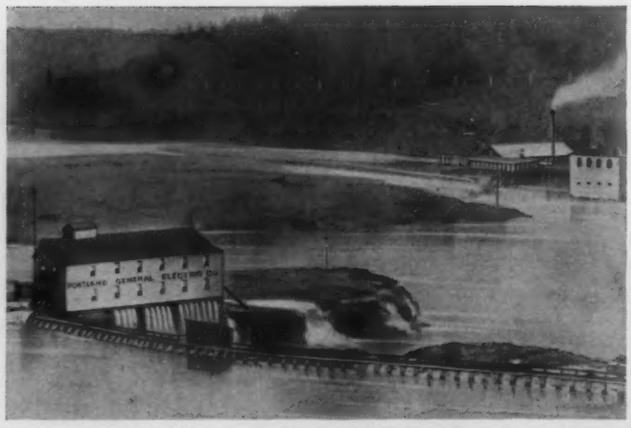
GraybaR

OFFICES IN 83 PRINCIPAL CITIES ... EXECUTIVE OFFICES: GRAYBAR BLDG., NEW YORK

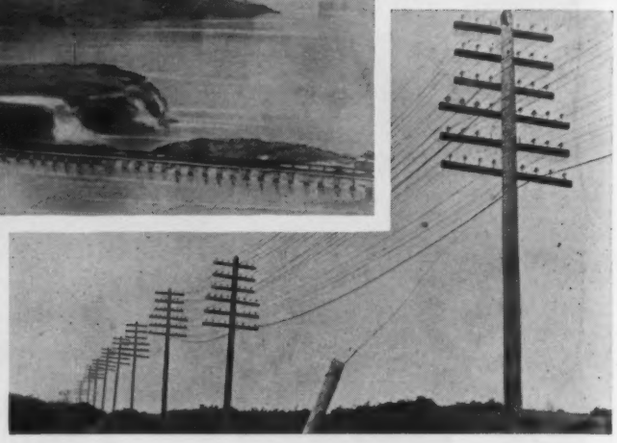
Fifty Years Celebration Held by Portland G. E.

The first transmission line in the world, as claimed by Portland General Electric Co., Portland, Ore., was made the inspiration for a 50-Year celebration by the company in June. The line, which was put into service in June, 1889, carried several direct current 7,500 volt circuits for arc lighting service in Portland from Station "A" on the Willamette River at Oregon City. These circuits were later changed to alternating current. Station "A", pictured here from a re-touched photograph taken in the early 1890's, was also built in 1889 with an installed capacity of 1,345 kw.

O. B. Coldwell, veteran vice-president, who entered the company's service in 1892, was the principal speaker at the celebration held in the Masonic Temple, Portland. He gave an illustrated lecture on the early pioneering experiences of the Willamette Falls Electric Co., Portland General Electric Co.'s immediate predecessor, and on the company's progressive development since those early days. R. R. Robley, superintendent of operations and company historian, presided.



Below is a look at the first transmission line in the world, built by Portland General Electric Co. in 1889. This line stretched 14 miles from Oregon City to Portland, Oregon



Above is pictured Station "A" of the Portland General Electric Co. Built in June, 1889, this station was located at Oregon City, Ore. Picture was taken in the early 1890's

Bureau Power & Light to Build Hoover Dam Transmission Line

Construction on the new Hoover Dam to Los Angeles power transmission line has been authorized and given to E. F. Scattergood, chief electrical engineer of the Los Angeles Bureau of Power & Light. This action was taken after the Board of Water & Power Commissioners rejected bids from outside contractors which exceeded the Bureau's estimate of the cost of the work, $1,412,599.

The lowest contract price was $2,241,870, to which must be added $129,683 for supervision and inspection.

The plan of construction by force account will save the municipal electric system almost $1,000,000 by using the Power Bureau's own forces.

Watt L. Moreland, vice-president of the Board, stated that the Bureau's experience and training in building transmission lines of exceptional character and the contractors' lack of such experience undoubtedly contributed to the difference in the respective cost proposals.

The new 287,500 volt line, which will increase Los Angeles' present Hoover power transmission capacity by 150,000 kw., will extend 258 miles from Hoover Dam to the Bureau's receiving station in the San Fernando valley.

Fly Named by Ickes as Acting General Bonneville Counsel

James Lawerence Fly, TVA general counsel, was appointed by Secretary of the Interior Ickes last month to be acting general counsel of the Bonneville power administration. Fly, who succeeds John C. Fischer, took over his new duties at Portland immediately. The new appointee served as a special assistant United States Attorney General from 1929 to 1934, then became general solicitor for TVA in 1934 and general counsel in 1937.

Secretary Ickes also announced that Fischer will be retained as special counsel for the Bonneville administration.

Hoover Dam Power Now Linked With Southern Calif. Edison

On June 21, Hoover Dam power was linked with the Southern California Edison Co.'s 1,000,000 h. p. hydro and fuel-electric generating system, as the first of a series of 110,000 h. p. Edison generators at the dam was put into service. The new unit had been on test run for several days and performed perfectly.

Energy generated at the dam is brought into the Edison system over the new 223 mile, 220,000 volt transmission line, which extends from the power house at the dam to the Edison receiving station at Chino, near Pomona.

The Hoover Dam plant is the twenty-seventh of Edison's system of power generating stations and the newest generator at Hoover is number seventy in a series of operating units.

This Edison Hoover Dam-Chino 220,000 volt transmission line provides the company with its fifth major 220,000 volt line, and the sixth, from Chino to Stanton, in Orange county, is now being built. Expenditures of approximately $4,500,000 have been made by the company to build its Hoover Dam line and Chino receiving station facilities. An additional $2,500,000 will be spent for the extension of the Hoover line service to a new station at Stanton. This latter system will be served by the second Edison unit to be installed at Hoover Dam, to be ready for operation this coming October.

1940 Bonneville Appropriation Totals $13,400,000

The Interior Department appropriation bill which includes $13,400,000 for Bonneville in 1940, passed both Senate and the House last month. The Bonneville appropriation was $1,000,000 less than asked by the late Administrator J. D. Ross and approved by the Bureau of the Budget.

Proposed Bonneville work for 1939-1940 fiscal year under the original $14,400,000 budget included; half of the second 220,000 volt line to Grand Coulee, $3,310,000; additions and extensions to substations, $2,605,000; transmission lines extensions, including Umatilla-Pendleton, Pasco-Ellensburg, Yakima-Pasco, Vancouver-Astoria and survey and other locations for other lines, $5,277,000; warehouses and garages for the main substation at Ampere, near Vancouver, $337,000; operation and administration, $400,000.

Thermador ANNOUNCES
A SEVEN LEAGUE STEP

THE business of the Woolwine-Norris Corporation . . . pioneer Electric Range Manufacturers in the west . . . has been consolidated into the Thermador Electrical Manufacturing Company.

THERMADOR ELECTRICAL MANUFACTURING COMPANY
ATLANTIC BOULEVARD AT SOUTH RIVERSIDE DRIVE, LOS ANGELES, CALIFORNIA
THIRD AT MADISON STREET . . . . . OAKLAND, CALIFORNIA

REA Activities

SCOTT J. ARMOUR, prominent grange leader from Sandpoint, Idaho, has been named president of the Northern Idaho Rural Electrification Assn., Inc.

MONTROSE RURAL POWER LINES ASSN., Delta, Colo., has been allotted $450,000 for construction of 415 mi. of transmission lines.

SURPRISE VALLEY ELECTRIFICATION CORP., Alturas, Calif., has been awarded $122,000 to build about 69 mi. of line to serve Modoc and Lassen Counties. The project had previously been allotted $437,500 to build 364 mi. of line, and $90,000 for the construction of a generating plant.

MOON LAKE ELECTRIC ASSN., INC., Mt. Emmons, Utah, has been awarded $285,000, of which $72,000 will be used to construct a generating plant, and the remaining $213,000 to build about 220 mi. of line in Duchesne and Uintah Counties.

STONEWALL ELECTRIC CO., Trinidad, Colo., has been allotted $65,000 to build 67 mi. of line to serve Las Animas County.

SAN LUIS VALLEY RURAL ELECTRICAL COOPERATIVE has received $60,000 to build 68 mi. of line, serving members in Costilla County.

SAN MIGUEL POWER ASSN., Nucla, Colo., was awarded $139,000 to build 116 mi. of line to serve members in San Miguel and Montrose Counties.

KOOTENAI COUNTY, WASH.—Power lines serving 417 farm homes in Kootenai County were energized for the first time May 19. The 205-mi. REA project was constructed at a cost of $150,000, and according to Jesse Vetter, project superintendent, about 400 additional homes will be served by the system.

COOPERATIVE (being formed) at Alsea, Oregon, has been awarded $205,000 to build about 175 mi. of line in Lincoln, Benton, Lane and Polk Counties.

Contracts Awarded

TO LUCAS ELECTRIC CO. LTD., Vancouver, for the electrical installation in a new apartment block, Vancouver, $140,000.

TO BENNETT & TAYLOR, Los Angeles, for construction of 114 mi. of line for Inland Empire Rural Electrification Inc., Spokane, to serve Newman Lake, Medical Lake and other sections near Spokane, $95,474.

TO U. S. MCKENNY CO., Seattle, for wiring of new social science building at Univ. of Washington, Seattle, $11,990; to Seattle Lighting Fixture Co., Seattle, for lighting fixtures, same building, $4,511.

TO MCNEILL ELECTRIC CO., Pueblo, for wiring of four dormitory buildings at the Colorado State Hospital, $19,587.

TO ENTERPRISE ELECTRIC CO., Pueblo, for wiring of detention building, Colorado State Hospital, $17,986.

TO ROWE ELECTRIC CO., Great Falls, Mont., for wiring of Civic Center Building, Great Falls, $22,373.

TO KELOWNA ELECTRIC CO., B. C., for electrical work on Governing Board General Hospital, Kelowna, $11,109.

TO PENNSYLVANIA TRANSFORMER CO., Pittsburgh, for transformers, regulators, disconnecting switches, lightning arresters for Laramie, Wyo., substation, $23,878. Schedule 2 to Westinghouse Electric & Mfg. Co., Denver, $11,400.

TO NEHRING ELECTRIC WORKS, Tacoma, for furnishing 55,000 lb. copper wire for Tacoma Lighting Department, $8,848.

TO GENERAL ELECTRIC CO., Denver, for switch gear and wiring materials for power plant improvements, Lamar, Colo., $11,927.

TO C. R. INMAN, Worland, Wyo., for construction of 59 mi. of transmission line for Flathead Power Co., Kalispell, Mont., $63,000.

TO O. A. CARLSON ELECTRIC CO., Seattle, for construction of 100 mi. of pole line for the Clearwater Valley Light & Power Co., Lewiston, $75,000.

TO HOMER G. JOHNSON, Portland, for construction of 76 mi. of line for the Northern Idaho Rural Electrical Rehabilitation Assn., Inc., Sandpoint, Idaho, $67,820.

TO BENNETT & TAYLOR CO., Los Angeles, for construction of entire project of the Idaho County Light & Power Cooperative Assn., Grangeville, Idaho, 172 mi. of line, $128,983.

TO I. M. DOBYNS, Worland, Wyo., for construction of 16 mi. of line for the Garland Light & Power Co., Powell, Wyo., $15,509.

TO W. W. CLYDE, Springville, Utah, for construction of 52 mi. of line for the Moon Lake Electric Assn., Inc., Mt. Emmons, Utah, $44,635.

TO BARNETT & BURDICK, Payson, Utah, for construction of 109 mi. of line for the Garkane Power Co., Panguitch, Utah.

TO BENNETT & TAYLOR, Los Angeles, for construction of 103 mi. of line for West Douglas Electric Cooperative, Inc., Roseburg, Ore., $80,228.

TO DENVER ELECTRICAL CO., for electric distributing and lighting system for Lowry Field, Colorado, $32,975.

TO GUILBERT BROS. ELECTRIC CO., San Jose, for electrical work on Mendocino State Hospital, $7,979.

AN EXPANSION PROGRAM involving the expenditure of $850,000 has just been announced by E. C. Phillips, district manager of Mountain States Telephone & Telegraph Co., Albuquerque, New Mexico. Construction of a new building adjoining the company's present quarters will account for $150,000. Business offices will be moved to the 1st floor of the new structure, which will also house central office dial equipment for local patrons' service. A power plant will be installed in the basement. The existing building will be remodelled and will be utilized for the housing of long distance and information exchanges, together with other switchboard equipment and necessary operators.

TRADE NOTES

Woolwine-Norris Corp. Joins With Thermador Electric Mfg.

Two leading Western electrical appliance manufacturers were brought together into one organization last month when the facilities, personnel and products of the Woolwine-Norris Corp. were consolidated into the 23-year old Thermador Electrical Mfg. Co., pioneer Western manufacturers of household electrical appliances.

"The step was a logical one," stated Harry H. Fogwell, president, in making the announcement, "for it supplies the Thermador company which heretofore confined its manufacturing to electric water heaters, room heaters and air conditioning units, with a time-proven line of electric ranges, as well as extensive manufacturing facilities. To Woolwine it brings the prestige of the well-established Thermador name and the wide electrical manufacturing and merchandising experience of the Thermador management."

The Thermador company was organized when Fogwell and W. E. Cranston consolidated the Everhot Electric Co. and the Hoffman Specialty Co. of California in 1932. The Woolwine-Norris Corp. was formed from the Woolwine Metal Products Co., 68-year old pioneer in the Los Angeles manufacturing field. Four years ago the company entered into the field of electric range and water heater manufacture. Distribution of the line has been confined principally to southern California; however, recent steps have been taken to widen the field to northern California and the Northwest.

In outlining the future merchandising plans of the company, vice-president Cranston announced that there will be no abrupt changes in the distributon policies of either the Thermador or Woolwine lines. As in the past the entire Thermador line will go through the established distributor and dealer organizations. Electric range sales will be confined to the 11 Western states for the present.

The new Thermador ranges were first displayed in southern California last month. Featured is an entirely new innovation in construction, "Bilt-in" models which permit the homeowner to purchase an electric range in sections to be built entirely into kitchen fixtures. They include four or six surface cooking units, baking ovens and warming ovens. The conventional range line includes seven models starting with a popular priced class and including deluxe models. Featured in the range

line is the "Climator," a fan-type electric heater built into the range.

All Thermador operations are being centered in the Woolwine plant at Atlantic Blvd. and S. Riverside Drive, Los Angeles where extensive changes are being made for more efficient production facilities. Factory branches and representatives will be located in Oakland, Phoenix, Seattle, Atlanta and Palm Beach.

Salt Lake G. E. Supply Modernizes Headquarters

The headquarters of The General Electric Supply Corp., Salt Lake City, the oldest wholesale electrical company in the Rocky Mountain territory, has just been completely modernized and refurnished. Beautiful display rooms have been provided to enable the company to present its full line of supplies, lighting equipment and appliances to dealers, and to allow dealers themselves to show these complete lines to their customers there.

This pioneer institution, which dates back to 1890, was formerly the Capital Electric Company, operating wholesale branches in Boise, Idaho, and Butte, Montana. In 1918 the company was sold by its founder, R. W. Nicol to the General Electric Co. No corporate change took place until 1928 when it assumed its present name. Jacob A. Kahn, who recently was appointed a commercial vice-president of the corporation, is present district manager.

FISCHER-GLASSFORD HARDWARE CO., Fresno, in observance of their 36th year, formally opened their enlarged new store in Fresno. Involving an outlay of $52,000, an expansion program gave the firm one-third more space. Interior and exterior remodelling was completed and other improvements made. The appliance department was moved from the basement to the main floor. E. L. Lord is president of the organization, with A. M. Bopp, vice-president.

GOUGH & THOMPSON, electrical jobbers, Vancouver, are marking the start of their 11th year in business by a two-fold expansion. The firm has just completed extensive renovations and enlargement of its fixture showroom, and has also just been appointed as B. C. distributors for the Gilson Snowbird washer. H. L. Gough is owner and president of the firm and has been in the electrical business for the past 15 years. He founded the present company 11 years ago.

VICTOR INSULATORS, INC., LeRoy, N. Y., announce the appointment of Maydwell & Hartzell, Inc., as exclusive sales representatives for the Pacific Coast territory for all porcelain products manufactured by the company.

Moved

SAN FRANCISCO LIGHTING FIXTURE CO. will move from its present location at 935 Mission St., Aug. 1, to the old Keeler-White Bldg. on Howard St., between 7th and 8th, according to A. H. Felchin, manager. Felchin recently rejoined the company after representing Leviton Mfg. Co. in northern California for several years.

W. L. COLPMAN has opened a radio and electrical service shop in the new Foodland Bldg., at Alberni, B. C.

THE UNIQUE LAMP & SALES CO., Seattle, wholesale lamp dealers, have moved to spacious new display rooms in the Columbia Bldg., Second Ave., Seattle.

PENTOKAN ELECTRIC CO., Penticton, B. C., to a larger location at 400 Main St., Penticton. The new premises will permit operation of a well equipped appliance service and repair shop. Everett Gordon is proprietor.

THE ASCROFT ELECTRICAL MACHINERY CO., Ltd., from 494 Yates St., Victoria, to new work shops and warehouses at 2300 Douglas St., Victoria.

E. B. HORSEMAN & Co., Ltd., electrical equipment and appliance jobbers, Vancouver, have opened a branch at 494 Yates St., Victoria.

RODIACK ELECTRIC CONSTRUCTION CO., San Francisco, from 2509 Bayshore Blvd., to 7 Teddy Street, San Francisco.

GIBBS BROS. ELECTRIC CO., Los Angeles, located for several years at 626 N. Main St., have moved into new quarters at 702 N. Broadway, Los Angeles.

FRANK GOODMAN, formerly engaged in business at the Progress Studios, Trail, B. C., has moved to 1186 Cedar Ave., Trail, where he will run the Home Equipment Store, handling electric ranges and washing machines, electrical appliances, lamps and furniture.

SCOTT-BUTTNER ELECTRIC CO., of Oakland, from 2214 Webster St., to new and larger building at 534 20th St. where facilities include a motor shop, wiring and commercial lighting fixtures.

S. P. LARSON, representative for Hubbard & Co., from 148 S. Hill St., Room 708, Los Angeles, to 416 W. 8th St., Room 522.

A. J. COLE, McGraw-Electric Co., Pacific Coast manager, from 834 Venice Blvd. to 1510 Santa Fe Ave. in Los Angeles.

PARAGON ELECTRIC CO., San Francisco contractors, from 68 Belcher St. to 84 Page St.

CHROMALOX
Super-Speed RANGE UNITS

The units that are positively *packed* with points that sell ranges which they equip. Specify them on the ranges you sell—use them for all replacements—they fit all ranges. Write to our nearest distributor for all details.

REPRESENTED by

MONTGOMERY BROTHERS
911 Western Ave., Seattle, Wash.
1501 N. W. Kearny St., Portland, Ore.
61 Fremont St., San Francisco, Calif.
420 S. San Pedro St., Los Angeles, Calif.
THE PETERSON COMPANY
1921 Blake St., Denver, Colo.
EDWIN L. WIEGAND CO.
7540 Thomas Blvd., Pittsburgh, Pa.

THE GARDNER ELECTRIC MFG. CO., Emeryville, Calif., has announced the appointment of Ray Smythe, 501 Park Bldg., Portland, Ore., as their representative in the Portland area.

KEITH-O-BRIEN department store, Salt Lake City, recently remodelled their 5th floor to make room for an electrical appliance department. E. Walter Peterson is in charge of the new division, with Marie Ford, assistant.

THE INDEPENDENT PNEUMATIC TOOL Co., Chicago, has announced the opening of a branch office at 1544 Broadway, Denver. This new branch, in charge of C. A. Turnquist, is staffed to render complete sales and service assistance on Thor portable electric and pneumatic tools.

(Top row, left to right) W. R. Batley, L. L. Dyer, Clayton E. Biggs, Fred G. Hamilton. (Second row) Chas. Hagey, Harry W. Dennis, G. Haven Bishop

ABOUT PEOPLE

PCEA Convention Golf Tourney Winners Listed

Winners in the PCEA convention golf tournament held at the Flintridge Country Club May 26 are as follows: H. M. Byllesby Cup—H. S. Warren, Westinghouse Electric & Mfg. Co., Los Angeles; Addison B. Day Cup —W. L. Phillips, Southern Calif. Edison Co., Huntington Park; Pelton Cup —J. H. Howard, Southern Calif. Edison Co., Los Angeles.

Warren, in the first flight, also took low gross, and Howard captured low net in the same division. Low gross in the second flight was made by Ray Taylor, Southern Calif. Edison Co., Santa Ana, while Phillips scored low net.

Eleven prizes in the blind bogey were taken by M. H. Jankelson, Incandescent Supply Co., San Francisco; W. H. Park, P. G. and E., San Francisco; W. J. Wilt, McGraw Electric Co., Los Angeles; C. D. Shedenhelm, Southern Calif. Edison Co., Santa Monica; W. W. Glosser, Hubbard & Co., Emeryville; A. E. Hitchner, Westinghouse Electric & Mfg. Co., Los Angeles; C. V. Soper, Southern Calif. Edison Co., Pomona; Glenn Luther, Southern Calif. Edison Co., Altadena; Bert Tice, Southern Calif. Edison Co., Los Angeles; G. H. P. Dellman, San Diego Consolidated Gas & Electric Co.; F. O. Dolson, Nevada-California Electric Corp., Riverside.

JERRY DRISCOLL has been appointed northern California representative for the Leviton Mfg. Co., Brooklyn, N. Y., manufacturers of wiring devices, etc. His office is at 21 South Park St., San Francisco.

A. W. CONOVER, former head of the Colorado Central Power Co., and member of the Rocky Mountain Electrical League, has been named a winner of the B. C. Forbes annual award. Conover, recently-elected vice-president and general manager of the Central Ohio Light & Power Co., submitted the best paper dealing with "Public Relations in the Electric Light and Power Industry."

PAUL K. CHURCHILL has been appointed manager for Line Material Co., for California, Nevada and Arizona. Churchill was formerly a member of the engineering department of the Southern California Edison Co., and prior to that was with the General Electric Co. He will make his headquarters at the Line Material Oakland branch office and will divide his time between there and the Los Angeles branch.

TOM G. SUPPLEE, well known to the Pacific Coast through many years in the appliance distribution field, has returned to this area as northern California representative for the Premier industrial-commercial vacuum cleaners made by the Electric Vacuum Cleaner Co., Cleveland. Charles J. James, Los Angeles, is Western manager for the line.

APPOINTMENT of William B. Himrod and Dr. Charles G. Haines to the Los Angeles Board of Water & Power Commissioners was confirmed last month by the City Council. Himrod is an attorney with wide experience in power affairs, while Dr. Haines heads the UCLA department of political science and has done considerable research in the field of municipal government. He is president of the American Political Science Assn.

South. Calif. Edison Honors Seven Retiring Employees

At a dinner at the Torrance civic auditorium last month, more than 600 employees of the Southern California Edison Co. honored seven veteran Edison men who retired June 30, after long terms of service with the utility company.

Those retiring and the length of their Edison service, are Fred G. Hamilton, manager of operation, 40 years; Charles H. Hagey, asst. to protection engineer, 29 years; Leslie L. Dyer, supt. of substation operation, 37 years; Clayton E. Biggs, supt. underground, 42 years; G. Haven Bishop, head of photographic dept., 35 years; Walter R. Battey, electrical engineer, 33 years, and Harry W. Dennis, chief civil engineer, 30 years.

W. C. Mullendore, Edison executive vice-president, and Fred B. Lewis, vice-president and general manager, were speakers at the dinner. R. G. Boyles, asst. mgr. of operation, was toastmaster.

Mullendore, complimenting the retiring men on their individual splendid records of service, declared that their years of loyalty to the organization and their noteworthy accomplishments had established Edison tradition that is an inspiration to the men and women of the company.

On behalf of the employees attending the dinner, Lewis presented each of the retired men with a gift suitable to each man's hobby or favorite recreation. Lewis is likewise a veteran Edison executive and he recounted incidents of stirring events in the history of the company.

G. W. FIRTH, manager of the Jarvis-Firth Electric Co., Vancouver, has completed the installation of the lighting system in the remodelled Strand Hotel at Vancouver.

Montana Power Co. Makes Three Personnel Changes

D. J. McGonigle, who has been connected with the new business department of the Montana Power Co. for 22 years, has been made general sales manager. McGonigle started with the company in 1916 as a meter application clerk, but was transferred to the sales department one year later. He joined the general office staff as manager of lighting sales. In 1937, when the dealer coordination plan was introduced, he was made manager of dealer relations and advertising, which position he has held until his new appointment.

S. K. Patterson, with 11 years experience in utility selling, has also been advanced by the company to residential sales supervisor. Patterson was formerly sales manager of the MP Helena Division. W. P. Dolan, who has been employed as an outside salesman since 1931, has been named advertising and sales promotion manager.

JOHN A. RINER has been promoted to assistant general manager of the Spokane United Railways, succeeding the late R. B. Childs, according to a recent announcement by J. E. E. Royer, vice-president and general manager. Riner joined the company in 1924, and has had experience in the collection, purchasing, and bookkeeping departments. Last January he was named assistant to Mr. Childs.

N. J. ETIENNE has been appointed sales manager of the Philco Division, Thompson & Holmes, Ltd., San Francisco, distributors for Northern California of Philco products and of a number of other leading lines of home appliances. Etienne recently resigned as managing director of the Pacific Appliance Institute, whose headquarters are in the Western Merchandise Mart, and was formerly for many years general manager of Lectrolines Division, Chanslor & Lyon Stores, Inc., San Francisco.

COL. THOMAS M. ROBINS, under whose direction the Bonneville project was built while he was division engineer at Portland, has been elevated to the post of assistant to the Chief of Engineers. The new appointment carries with it the rank of brigadier general.

BRUCE BROWNLEA, Westinghouse Electric Supply Co., San Francisco, has been transferred from the San Jose territory to become a Westinghouse apparatus specialist in San Francisco. Claude Pearson has been given the San Jose and south coast territory, and Bill Urquhart the San Francisco city sales territory formerly held by Pearson.

Showroom Openings at Western Mart Announced

George H. Williams, representative of the Conlon Corp., Chicago, and the Copeland Refrigeration Corp., Sidney, Ohio, is opening an office and showroom on the 5th floor of the Western Merchandise Mart, San Francisco. Williams until recently was connected in a sales capacity with the Leo J. Meyberg Co., San Francisco.

Other showroom openings on the 5th floor of the Mart will be by Idealite, Inc., New York, manufacturers of table lamps, who will be represented by Robert Loring, and the Earlco Lamp Corp., Los Angeles, whose president, Earl Cohen, stated that he plans frequently to visit dealers and buyers in the northern California territory.

Deaths

HENRY W. BEEKMAN, 54, manager of the Berkeley office of the P. G. and E. for the past nine years and Berkeley civic leader, died May 30 from a heart attack at his home. Beekman was president-elect of the Berkeley Rotary Club. He was connected with the P. G. and E. for 30 years.

THOMPON ADAMS CAMPBELL, 59, well-known electrical contractor, died at his home in Vancouver recently. He had resided in Vancouver for 35 years.

FRANK E. BLAKE, for many years general manager of the Hawaiian Electric Co., died May 19. He had retired from active service two years ago.

Stocks at San Francisco
Electrical Specialty Co., Inc.,
316 Eleventh Street

Stocks at Los Angeles
Electrical Specialty Co. of So. Calif.,
451 South San Pedro Street

Stocks at Seattle
Electrical Specialty Co., Inc.,
714 Fourth Avenue

For the Coast Trade

At your doorstep you now have an adequate stock of popular D-H alloys, wires, ribbons, rods and other forms.

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POWER & DISTRIBUTION TRANSFORMERS
Gardner Electric Mfg. Co.
NIAGARA AIR-INSULATED CURRENT TRANSFORMERS
Niagara Electric Improvement Corp.
CABLE GRIPS
Kellems Products, Inc.
CONNECTORS, GROUND ROD CLAMPS, UTILITY HOISTS
Jasper Blackburn Products Corp.
GROUND LINE POLE TREATMENT
Osmose Wood Preserving Co.
METER JEWELS
Herman D. Steel Co.
CROMPTON TONG TEST AMMETER
LOW VOLTAGE GENERATORS
Columbia Electric Mfg. Co.
UNDERGROUND TOOLS & EQUIPMENT
T. J. Cope, Incorporated
TREE TRIMMING EQUIPMENT
Bartlett Manufacturing Co.
FRICTION AND RUBBER TAPES
Clifton Manufacturing Co.
BURNHAM SAFETY LINE TOOLS
Burnham Line Tool Co.

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PROFILES OF THE MONTH

Miss Blanche Yoneda is jubilant at winning the grand prize of a Hotpoint range, presented as the climax of the recent Honolulu Star Bulletin's Hawaiian Electric Co. electric cooking school, just shortly before her wedding. With her is Charles E. Nolan, Hawaiian Electric Co. The school was conducted by Miss Ilah Manchester, Edison Appliance Co., and Mrs. Miriam Jackson Emery, Hawaiian Electric Co.

C. H. Thrane was unanimously elected to the presidency of the Los Angeles Electric Club at the June 5 meeting of the association. Thrane, who is sales manager for the General Electric Supply Corp., served as an Electric Club committee chairman for several years, and during the past year as 1st vice-president. He succeeds M. G. Sues, manager, Leo J. Meyberg Co., who now is executive committee head

H. E. Ferris is now sales manager for the Mountain States Power Co., Albany, Oregon, and has initiated a new dealer merchandising program for the company's properties in Oregon, Idaho, Montana, Wyoming

Caught talking over the success of the Matchless Electric Home at the Los Angeles Housing Show are F. L. Hockensmith, Burdette Moody and Art Elliott

A discussion of various Modern Kitchen Bureau problems is in order here. In on the conference are (left to right) Dorothy Dickenson, Joseph R. Gerber Co.; Ralph Milsap, advertising manager of Portland General Electric Co.; F. H. Harrigan, western field representative of the Modern Kitchen Bureau; George Madison, dealer promotion manager, Portland General Electric Co., and A. C. McMicken. Meetings like these help to promote both sales and profits

Preview of coming campaigns by

P·G·and E·

JULY

ELECTRIC RANGE CAMPAIGN

After months of sustained build-up, including a series of full-page advertisements in national magazines, the ELECTRIC RANGE will be advertised again during July. For our part we will run a series of company-dealer advertisements in local newspapers. Also we will use 24-sheet outdoor posterboards, truck banners and bill stickers. We suggest that any dealer doing business in the company's electric range territory get in touch with our local office and learn more of the details of this promotion. If you want copies of our advertisements before you when you write your tie-ins, you can get them from your local paper.

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Electric Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Electric Appliance Society, 1355 Market St., San Francisco, Calif.

EW 107-739

Before the utility can sell more current, or the dealer more appliances, the contractor must provide sufficient electrical facilities to insure their continued use. This, then, should be the primary objective of the electrical industry—to make sure that every home is supplied with sufficient outlets and adequate wiring, not only for present needs, but for the vastly increased uses of electricity in the years to come.

PACIFIC COAST *Electrical* BUREAU

447 SUTTER STREET, SAN FRANCISCO • 601 WEST 5TH STREET, LOS ANGELES